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The Cost

MAJOR C. C. TURNER'S series of articles in the *Daily Telegraph* on American air lines has been intensely interesting. These articles have shown that the internal air lines of the United States have achieved a wonderful standard of performance. Their services are safe, fast, and frequent, and they have in some ways set a standard to the world. The machines, moreover, are very comfortable, and the cost to the travelling public is comparatively low. The United States, which started with air mails and rather lagged behind some other countries in providing the air carriage of passengers, is to be congratulated on the way it has shot ahead once it turned its attention to the latter form of activity.

Naturally, there runs through Major Turner's articles a tendency to compare American results with those of the British Empire. At the same time, his articles deal mostly with the internal air lines of America rather than with Pan American Airways, and he himself recognises that of all the American companies it is only Pan American Airways which is justly comparable with Imperial Airways. That point may perhaps be overlooked by some readers of his articles. There is no part of the British Empire where the situation is at all similar to that inside the United States. The only part of the British Empire which is thickly populated by well-to-do white people is the British Isles, and these islands are small, blessed with a climate which breeds a virile race (whatever folks may say about the results of the Olympic Games) but not conducive to regular air transport, and covered with a network of very efficient railways. The same conditions do not obtain in Canada, South Africa, Australia, and India, where great spaces, better flying weather, and fewer railways give a chance to aircraft to show their worth.

In the other lands of the Empire, and in communication between the various British lands, it is obvious that great speed of flight cannot be the first consideration. When flying in Australia (except on a few special routes) or to Australia, even a slow aeroplane can beat ground transport by such a handsome margin that it would have been extravagant to start off with a fast and expensive air service. When a new air service is started, the economics of the situation may be summed up by the saying that one should fly at the lowest economic speed which is attractive and charge the highest rate of fares which is attractive. As time goes on and the service gains in reputation it becomes necessary to modify that policy. A demand for speed arises among the travelling public, and it would not be wise to disregard it, provided that the desire can be gratified at a cost which is not ruinous to the operating company. Competition may actually force the hands of the company, and to India, and some way beyond, the Dutch and the French provide competition for Imperial Airways.

Who Pays?

Then comes the question of how to find the money with which to pay for the expensive commodity of speed. Where there is competition and conditions other than speed are roughly equal, that money has to be found, or the company must go out of the business. So far, the air traffic has nowhere paid for the speed, or even for the ordinary services. It becomes necessary for the Government, which means all the taxpayers of the nation, to provide the money. A majority of the taxpayers probably have no hope of ever travelling on the subsidised aircraft, though a somewhat larger number may use the air mail service. Unless they got indirect advantages from the air services, and from fast air services, the taxpayers might reasonably object to seeing their money taken from them and handed over to the shareholders of the air companies.

It has now become clear that a whole population can and does benefit from wisely conceived air services. In particular the British Empire cannot afford to do without the air link. Of great benefit to many individuals, it has become indispensable for the peoples of the British Empire as a whole. Sir Alan Cobham once pertinently quoted the case of a railway in Malaya which never paid its way and was never likely to pay its way, yet the whole prosperity of the Colony depended on that railway. To have closed down that railway would have meant universal ruin. The same is true, or at least will soon be true, of airways throughout the British Empire.

The only question is, how much ought a country to pay for its air services. Major Turner says that in twelve years the people of the United States have paid £36,000,000 in mail subsidies. During the same period the British Government paid only three and a half millions in subsidies to Imperial Airways. The two cases, as has been pointed out, are not comparable. One would like to know the subsidy paid only to Pan American Airways, for one thing; and, for another, there have been rumours that all of the American expenditure has not been very wise. Foolish spending cannot fairly be counted in such a reckoning. Everyone will almost certainly feel sure that the British Government would not have been wise to spend so lavishly as the United States have done, while we are all glad that the speed of our Empire air services is shortly to be increased. After reading Major Turner's articles one feels that there is little to regret in the history of British air subsidies.

A Painful Episode

THE dismissal of Sir Christopher Bullock, Permanent Secretary to the Air Ministry, from the Civil Service by the direction of the Prime Minister is an event as painful as it is rare. Fortunately the report by other members of the Civil Service, on which the Prime Minister took action, emphasises that there is no question whatever of corruption in the case. It is a question of the Civil Service code of conduct. That code has quite rightly been placed on the very highest level. The Civil Service is well paid, as it ought to be; its entrance examination ensures that it shall be staffed by men of a very high level of intellectual ability; and, though here and there a man may find himself in an easy post for a brief time, in all important places and at all important times the Service demands from its members untiring energy, diligence, and initiative.

Above all, the Civil Service demands from its members a wholehearted and completely selfless devotion to the interests of the public. Like Cæsar's wife, the Civil Service "must not even be suspected." In India, for example, the standard of conduct for the Indian Civil Service seemed at first fantastically high to some of the peoples of India, but all of them have learnt to appreciate what blessings that high standard has brought to the welfare of India. At home the Civil Service is less prominently in the eyes of the public, but its standards are just as high. Those standards must be maintained, although an individual be sacrificed.

NOT A MUNICIPAL THOROUGHFARE: During Navy Week the carrier *Courageous* lay at Portsmouth, and the public thronged on board to see this unusual warship.

The Outlook

A Running Commentary on Air Topics

The Limit

FROM the earliest days of flying there has been a tendency among some of those technically interested to greet every new step forward with an expression of the opinion that this represented pretty well the end, and that further progress will of necessity be very slow and that the limit has almost been reached. After each of the Schneider Trophy contests one used to hear this view put forward; yet the speeds continued to go up, not in dribbles but by leaps and bounds. The curve was still very much on the upgrade when we had the last Schneider Trophy contest, and if the money were available to-day for further building and research there is no great technical difficulty in vastly improving upon the present speed figures.

In just the same way there are many who firmly believe that no great progress is likely to be made with the speed, range and carrying capacity of commercial aircraft. The operation of North Atlantic services in the fairly near future is contemplated, but there are few who believe that substantial pay loads will be possible for many years to come, apart, of course, from the possibilities of the Mayo "Composite" scheme.

Superficially, there is quite good cause for such a belief, but it is always worth while to sit back occasionally and bear in mind that there exists an ideal, a very simple sort of measuring stick by which contemporary aircraft may be judged. In fact, there are two such. Some years ago, Professor B. Melvill Jones, of Cambridge, established the ideal of the perfectly streamlined aeroplane. That was what may be described as a practically attainable ideal. There is another, which is never likely to be attained, but which it is, nevertheless, useful to bear in mind now and again. If one recollects the results published by various nations of tests in wind tunnels on wings of a standard aspect ratio of six, it is found that a great many of these wings have maximum lift-drag ratios of 20 or more. Even fairly thick wings may reach a figure not far short of this. Until, therefore, designers have succeeded in producing the "all-wing" aeroplane we cannot be said to have reached the maximum attainable efficiency.

What it Means

WITHOUT going into involved performance calculations one may form a picture of what even the approach to the ideal would mean in very simple figures. If the drag of a complete aircraft could be reduced to that of the wing only, it would mean, for a lift-drag ratio of 20, that for every 1,000 lb. of weight the drag would be 50 lb. only. At a speed of 300 m.p.h. this would represent no more than 40 horse-power for every 1,000 lb. of weight, and even at 400 m.p.h. the power required (not taking into account propeller efficiency) would only be a little over 53 horse-power.

Such figures are, of course, not likely to be achieved, mainly because the maximum lift-drag ratio of a wing occurs nearer to the minimum than to the maximum speed. This means that, even if it were possible to suppress completely all excrescences, including the fuselage, the wing loading would have to be so high that the take-off and landing speeds would be absurdly high. In practice, the "flying wing" will probably have to fly at an angle corresponding not to maximum but to some smaller lift-drag ratio, so that the power required will go up.

Many years ago the late Dr. Junkers took out patents on an "all-wing" aircraft. The machine was never built, mainly because only in a very large machine can the "all-wing" ideal be approached; but designers all over the world are working on the problem, and *Flight* has been privileged to discuss with one well-known British aircraft designer the possibilities of achieving in one step a very great improvement in aircraft efficiency. It is not possible to state at present the exact means whereby this designer expects to attain his remarkable performance, but there is no reason to doubt the validity of his calculations, which are based upon making use of every known aid to efficiency and combining them in a logical way. High-speed commercial aviation on long stages with a very good pay-load seems within the realms of possibility.

Horse or Hound

THE old order changeth, giving place to new. Waterloo Bridge is no more, and the Cranwell beagle pack has been sold. Somehow it is hard to think of Cranwell without the beagle pack. How one used to admire the Marathonic qualities of officers and flight cadets who have run behind the beagles across country! The hares, no doubt, had their own views on the matter, but for the field, what a change this exercise afforded from moving the feet on the rudder bar (and being careful not to overdo it) or from the benches of the classroom!

But is the old order, after all, really giving place to new? Is it not rather giving place to something even older? In place of the beagle pack, Cranwell has started a riding school. People are beginning to talk of the not-far-distant time when children will be taken out to Whipsnade to see the surviving specimen of the genus horse, and motorists in our cities pray that that day may not be too long deferred. Excellent exercise the horse provides without doubt, but one in which the feet and legs do not bear the weight of the body, as Dame Nature intended that they should. In the Army the horse is gradually giving way to the petrol vehicle, and so it rather makes one scratch one's head to see the R.A.F. displaying increased devotion to the saddle. But, after all, one may reflect that a riding school gives excellent practice in forced landings, and so it may be that Cranwell has chosen well!

Practising Invasion

A COMBINED operations exercise, in which the Navy and Army will take part, is to be held in the neighbourhood of Milford-on-Sea, Hampshire, starting on August 25 and lasting about four days. The Army troops will include one co-operation squadron of the R.A.F. The object is to practise disembarking and re-embarking a small force of troops against slight opposition. As practice in the actual business of getting troops out of ships on to the shore it will doubtless be of value, but in dealing with tactical problems it does not afford much interest.

At Gallipoli it was shown that troops could be landed (though at a very heavy cost) in the face of strong opposition from a defending army. If the defence of the future includes a strong force of bomber aircraft, plus an adequate supply of information, a hostile landing by day should surely be impossible. Battleships can be armoured to resist damage (at least, important damage) from air bombs, but transports are bound to be vulnerable. If the sea in question is so narrow that it can be crossed by the transports and their naval escort well within the hours of night, one would expect the defender's bombers to have left cards on the said transports while they were still in their own harbour.

The ultimate winner is flagged off : Mr. George Reynolds and the Hawk Speed Six, flown by Mr. Humble.

LONDON to NEWCASTLE—and AFTER

W. Humble (Hawk Speed Six) Wins at 183.75 m.p.h. : The Two Original Leaders Disqualified on Technical Point

(Illustrated with *Flight* photographs)

AT nine o'clock on Saturday morning it still appeared that our magnificent summer weather might cause the postponement of the London-Newcastle race.

A haze covered the whole of the metropolitan area, reducing visibility to a matter of a mile or so, and there were clouds at 500 ft. and even lower. Only those pilots whose machines were already at the Brooklands starting point could safely obey the injunction which demanded that all competing machines should be there before 9 a.m. for the purpose of "verification." Even a pilot as experienced as Mr. H. L. Brook had failed to get through that morning—from Hanworth.

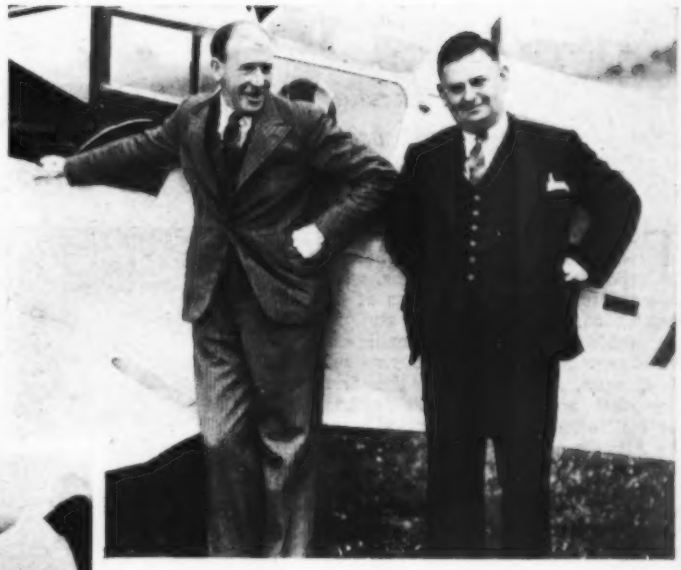
However, in due course, ten of the fourteen entries were on the line, one of them having been brought up that morning from Grimsby; the pilot, Mr. Grice, had telephoned the organisers at an earlier moment to explain that it was then impossible to get through. Once again the regulations were necessarily expanded to suit the situation. Before mid-day the meteorological forecast, which had predicted a general improvement, had been justified, and further north the visibility was given as anything up to ten miles, with a safe cloud base. At Brooklands visibility was still of the two-mile order, with clouds low enough for the Chilterns to be considered with misgiving.

It had been ordained that Yeadon should be a control point, and competitors were expected to pass over this aerodrome at something less than 400 ft. and more than 200 ft. This regulation was due to cause a little trouble after the finish. The track, therefore, crossed Staines, passed about four miles to the east of Halton, crossed Northampton and the eastern outskirts of Leicester, passed within three miles of Hucknall, and over Sheffield on the way to Yeadon. Thereafter Catterick was the only aerodrome within sighting distance of a pilot flying on his track.

Of the non-starters the Cessna had been sold, and Mr. Hall had already told us that, unless there was hope of a reasonable following wind, he would scratch his Praga. Mr. Mackay's Praga was, however, on the line, though a refuelling stop at Yeadon, if necessary, would spoil any chance he had of being placed. Mr. Brook was flying his Australian-record Falcon, and Mr. Bickerton's assistant was F/O Charles Hughesdon, who flew this same Hawk Major in the King's Cup. The latter, by the way, was depicted in *Flight* at that time in the form of one John Hopcraft—in perpetuation of a simple, if regrettable, transposition error in the report of the Isle of Man races.

Collusion : Capt. W. Dancy (left) and Mr. Reynolds smoke a quiet cigarette during the half-hour interval after the departure of the limit man from Brooklands.

The first machines to cross the line at Woolsington were Mr. Bickerton's (he had averaged 148.5 m.p.h.) and Mr. E. F. Walter's Hawk Major (at 155.25 m.p.h.), but, unfortunately enough, these were the only two to fail to pass the Yeadon control in the correct manner. Mr. W. Humble's Hawk Speed Six was then in third place, and after the report from Yeadon and a stewards' meeting the leaders were disqualified, leaving the Speed Six as the winner—at 183.75 m.p.h. Mr. S. W. Sparkes (Vega Gull) was therefore second, and Mr. H. J. Wilson (Gipsy Swift) third. All these, including the unfortunates, arrived within a period of less than two minutes over a 263-mile course with a varying wind, and Mr. Bickerton's machine arrived within sixteen seconds of the estimated time for the arrival of the first finisher. A triumph of the slide-rule, indeed. Messrs. Dancy and Rowarth were, of course, the handicappers.



In second place: Mr. S. W. Sparkes and his passenger with their Percival Vega Gull.

The unlucky ones: Mr. J. M. Bickerton and Mr. E. F. Walter who finished first and second in the race, but were disqualified on a technical point at the Yeadon control.

Consultation: Miss C. R. Leathart (left) who finished fourth in a Pobjoy Swift, and Messrs. Wilson and Humble (below) who finished third and first respectively.

In the afternoon the Newcastle Club held a garden party, and the B.A. Swallow, which has been presented to the club by Mr. Samuel Smith, was duly christened by Mrs. Smith. Unfortunately, the Tiger Moth (a present from the same munificent source) was not delivered in time for the ceremony. This machine will be fitted up for night flying and early in September Newcastle's airport will, too, be fully equipped for night operations; in the meantime a portable electric floodlight is being used. In the evening the usual dinner-dance was held at the Station Hotel, with the Lord Mayor, competitors and visiting pilots as guests of the club.

As usual, the party by no means ended with the big race, and at 2.30 p.m. on the following day eight machines left Woolsington for York on a private race handicapped by Mr. F. D. Bradbrooke. There were three prizes, of £3 10s., 10s. and 5s. (put up by the competitors), and the race was won by Mr. H. C. Macphail (Monospar S.T.25). With customary persistence the organisers had him disqualified forthwith (for passing the Lord Mayor on the wrong side at Newcastle!), leaving Mr. E. F. Walter and Miss Dorothy Kay (Hawk Major), Mr. H. J. Wilson (Gipsy Swift) and Mr. Bickerton (Hawk Major) as the ultimate prize-winners. Thence, undeterred, the pilots roared away to Sherburn to deliver the trophy to Mr. Humble (who is full-time instructor there) and to Mr. Bickerton's private aerodrome near Denham for the final tea and toast—or what you will.

RESULTS

Pilot.	Machine.	Handicap.	Net Time.	Speed.
		hr. min. sec.	hr. min. sec.	m.p.h.
*J. M. Bickerton ...	Hawk Major ...	21 19	1 46 20	148.5
*E. F. Walter ...	Hawk Major ...	16 13	1 41 47	155.25
1. W. Humble ...	Hawk Speed Six ...	Scr.	1 25 58	183.75
2. S. W. Sparkes ...	Vega Gull ...	7 31	1 33 56	168
3. H. J. Wilson ...	Gipsy Swift ...	12 43	1 39 25	159
4. Miss Leathart ...	Pobjoy Swift ...	36 5	2 3 43	127.75
5. H. L. Brook ...	Miles Falcon ...	25 3	1 55 58	136.25
6. S. K. Jopp ...	Hawk Major ...	24 17	1 57 1	135
7. J. R. Grice ...	B. A. Swallow ...	1 6 26	2 52 12	91.75
8. W. M. Mackay ...	Hillson Praga ...	1 15 43	3 4 28	85.5

* Disqualified.

PRIZES.

£75 and the Newcastle-upon-Tyne Trophy to Mr. W. Humble.
£20 to Mr. S. W. Sparkes.
£10 to Mr. H. J. Wilson.
£10 to Mr. W. Humble for fastest time.

Witchcraft at Heston

THE other week at Heston Mr. Mark Lacayo, of Airwork's sales department, took off solo in an Avian for Amsterdam. At 600 ft. he felt a presence on his shoulder and looked round through his goggles into the horrified face of a large black cat. It mewed something like: "I am the cat that walks by himself, and all places are alike to me!" and went on using him as a promenade deck till he made a grab at it. It then fled off down the inside of the fuselage to the tail, where it remained till he had turned back and landed. They extracted it, protesting furiously; a thorough search revealed no kittens, and Mr. Lacayo resumed his journey.

NEW SECRETARY to the AIR MINISTRY

Col. Sir Donald Banks, D.S.O., Director-General of the Post Office, has been Appointed Permanent Secretary to the Air Ministry in Place of Sir Christopher Ll. Bullock

THE Air Ministry is to be congratulated on gaining as Permanent Secretary a man who has, while representing the interests of the Post Office, been engaged in studying the problems of internal air mails and also in negotiating with the Governments of Canada, Newfoundland, the Irish Free State, and the United States about the institution of an air service across the Atlantic. Sir Donald is, therefore, completely versed in all details, apart, presumably, from technical details, of two of the greatest projects now under discussion for extending the use of aircraft in the interests of Britain and the British Empire. To a man of such experience there should certainly be no difficulty in mastering the cognate problems of pushing British air lines still farther across the Empire and also across foreign parts of the globe.

Col. Sir Donald Banks, D.S.O., the new Permanent Secretary.

From the earliest post-war days, even those days when annual air conferences used to be held in the Guildhall, the attitude of the Post Office towards air transport has never been unfriendly. At that time the G.P.O. merely stipulated that air transport should give proof of ability to deliver the goods. That was a period of intense air optimism modified by frequent forced landings, and the calm common sense of the Post Office came like a breath of fresh air into the Guildhall atmosphere of heated aspirations. Of late, since engines have become remarkably reliable and air schedules are regarded as inviolable, the Post Office has been a ready helper, and has even shared in forming the most ambitious plans for Empire air mails. For internal mails, too, the Post Office has adopted the principle of using the aeroplane wherever it gave an advantage, and that without extra charge to the public. In these great and novel conceptions it is understood that Sir Donald Banks was an active moving spirit.

It is not to be expected that Sir Donald will have an equal knowledge of R.A.F. problems. He takes up his new post at a time when there is intense activity and development in progress at the Air Ministry on both the Service and the civil side. He becomes a Member of the Air Council, and will, therefore, have to take his share in dealing with the R.A.F. expansion, but his chief duty on the Air Council will be to represent the financial side of the problem. Plans will naturally originate with the Chief of the Air Staff and the three Air Members. It may be taken for granted that an able Civil Servant such as Sir Donald undoubtedly is will find no insuperable difficulty in mastering his side of R.A.F. problems in a short time.

Sir Donald's personal record commands respect. He entered the Civil Service in 1909, but when the war broke out he enlisted in the Yeomanry. He was given a commission and speedily gained promotion. Before the end of the war he had commanded the 10th Battalion of the Essex Regiment and the 8th Battalion of the Royal Berkshire Regiment, and he was also made a Companion of the Distinguished Service Order. After the war he rose steadily in the Post Office, was private secretary to several Postmasters-General, and for several years was Controller of the Savings Bank department. In January, 1934, he was made Director-General of the Post Office, then a new post, and has been responsible for the modernisation of the Post Office and for the recent improvements in many branches of its activities.

SIR CHRISTOPHER BULLOCK DISMISSED

A SPECIAL Board of Inquiry was appointed by the Prime Minister last month to investigate allegations against Sir Christopher Bullock, Permanent Secretary of the Air Ministry. The members of the Board were Sir G. Evelyn P. Murray, Chairman of the Board of Customs and Excise; Sir Richard V. N. Hopkins, Second Secretary to the Treasury; and Mr. L. A. J. Granville Ram, Second Parliamentary Counsel.

The Board of Inquiry had no power to compel the attendance of any witness, but the report states that all necessary evidence *was* received and no witness declined to answer any question put to him. The Board held twelve meetings and heard evidence from Sir Ch. Bullock, Sir Eric Geddes, Mr. Woods-Humphery, Viscount Swinton, the Marquess of Londonderry, and Sir Warren Fisher. At the instance of Sir Christopher Bullock, the Board also heard evidence from Mr. Geoffrey Lloyd, M.P., Mr. Loel Guinness, M.P., Sir Walter Nicholson, and Mr. A. H. Self. As a result of the report, Mr. Stanley Baldwin directed that Sir Christopher Bullock be dismissed from the Civil Service.

The report deals with four conversations which Sir Christopher Bullock had separately with Sir Eric Geddes and Mr. G. E. Woods-Humphery, chairman and managing director respectively of Imperial Airways, Ltd., and it is necessary to bear in mind that these conversations took place during a period when negotiations were in progress between Imperial Airways, Ltd., and certain Departments of State concerning the contract in connection with the new Empire air services. The Board states in its report that the conversations had not influenced the negotiations, nor had there been any attempt to barter honours in return for personal advancement, and neither had any desire or suggestions of such barter been conceived by anyone concerned in the transactions. Lord Swinton, in evidence, informed the Board that from enquiries he had made, it was his considered opinion that every possible effort was made by Sir Christopher to secure the best terms for the Government, that, in fact, a very satisfactory agreement was reached, and that Sir Christopher had been active, assiduous and single-minded in securing what he considered the best terms.

"In order that these discussions may be seen in their true light," the report states, "it is necessary to appreciate that which clearly emerged at our enquiry, namely, that Sir Christopher Bullock is a fluent talker and not always a very patient listener, and that, at all material times, he had constantly in mind the question of leaving the Civil Service and entering upon a career in the world of commerce and business."

In the spring of 1934 negotiations were about to begin between the Air Ministry and the G.P.O. on the one hand and Imperial Airways on the other concerning the carriage of first-class Empire mail, and Sir Christopher conceived the idea that it might be an opportune moment for the recognition of the services of Sir Eric Geddes by the conferment upon him of a high honour. He put the idea before Lord Londonderry, who asked whether an honour would be acceptable to Sir Eric, and, if so, of what nature. Sir Christopher interpreted this as giving him authority to approach Sir Eric on his views upon the matter. In May, 1934, Sir Christopher was going on leave and thought it desirable that he should see Sir Eric before he went away. He saw Sir Eric at the latter's flat, and Sir Eric indicated that a certain honour would be welcome to him if it were in recognition of his services in linking up the Empire by air.

Afterwards, Sir Christopher asked Sir Eric's advice with regard to

s own future, and mentioned that he would like to succeed Sir
iz as chairman of Imperial Airways. Sir Eric said he had no
a about leaving, and Sir Christopher then said he might get
nself appointed as Government director of Imperial Airways.
r Christopher neither asked for nor received any promise of Sir
ric's support.

On June 21, 1934, Sir Christopher Bullock lunched with Sir Eric Geddes and a long business discussion took place on the main principles of the proposed agreement between the Government and Imperial Airways. After the conclusion of the discussion, the conversation turned to general topics, and Sir Eric asked why, after the talk on May 14, his name had not appeared in the Birthday Honours List published on June 4. Sir Christopher replied that the honour was not for the Birthday List, but was to be given at a later date when the agreement was signed. To this Sir Eric replied that if it was to be a reward for negotiating the agreement it was out of the question for the present, and they had better forget about it.

That Sir Christopher did not understand Sir Eric's objections at that juncture was shown by the fact that he again raised the question in October, 1934. Owing to the relationship between Imperial Airways and the Air Ministry, Sir Eric contented himself with an endeavour to give general discouragement to Sir Christopher's ambitions. Sir Eric related this interview to Mr. Woods-Humphery and another of his co-directors. After turning the matter over in his mind, Sir Eric became increasingly uneasy and on July 6 made a note of his recollection of the conversations. This he showed to the two co-directors to whom he had previously spoken.

In the early autumn of 1935, Sir Christopher Bullock's desire to leave the Service was especially in his mind, and he asked Sir Eric Geddes for a personal talk. A meeting was arranged at Sir Eric's flat, on September 9, and at this Sir Eric recalled the views he had expressed at the last interview, and told Sir Christopher that he found it embarrassing to discuss the question of Sir Christopher joining the board just as he had been embarrassed by the discussion about the bestowal of an honour upon himself while the negotiations for a contract between the company and the Ministry were still being conducted. Sir Eric also referred to embarrassing rumours as to Sir Christopher's possible succession to the chairmanship. Sir Christopher agreed that it was unfortunate that there should have been any such talk, and explained that he was in no way responsible for it.

A *Government Directorship*

For some years past it had been the custom of Mr. Woods-Humphery and Sir Christopher Bullock to lunch together occasionally for the purpose of discussing matters of business. Such a luncheon took place at the invitation of Mr. Woods-Humphery on June 11, 1936. Towards the conclusion of the discussion of a few outstanding points arising out of the Empire mail agreement, Sir Christopher said he had a matter of a private nature he wished to raise. He recalled to Mr. Woods-Humphery that Sir Walter Nicholson was about to reach the age at which he would become qualified for a Civil Service pension, and said Sir Walter might like to be relieved of his Government directorship at an early date. He told Mr. Woods-Humphery that he himself might wish to be considered for a Government directorship later on. He asked how Mr. Woods-Humphery would view the suggestion that one of two gentlemen whom he named should be appointed as a temporary measure, presumably until Sir Christopher himself was able to take up the appointment. Sir Christopher referred to the rumours about him succeeding Sir Eric, and the report states that it is disputed whether at this point Mr. Woods-Humphery asked whether Sir Christopher had seriously considered succeeding Sir Eric. Mr. Woods-Humphery emphatically denies it. Sir Christopher asked whether Mr. Woods-Humphery had any ambition to succeed Sir Eric, and indicated that his own view was that Mr. Woods-Humphery was more suitable as managing director than as chairman. Mr. Woods-Humphery replied to the effect that he had no ambitions of that kind. Sir Christopher said he thought that if he himself were chairman and Mr. Woods-Humphery deputy chairman and managing director, that would be a very good working combination. During the conversation, Mr. Woods-Humphery asked point-blank whether Sir Christopher had mentioned to Sir Eric Geddes his idea of one day becoming chairman. Sir Christopher regarded the question as placing him in a dilemma, and the reply he made was to the effect that he had just mentioned it, very vaguely, some time ago. At the conclusion of the conversation Sir Christopher asked Mr. Woods-Humphery not to mention this to anyone because he wished to mention it himself in the first instance and proposed to take an early opportunity of doing so. To this Mr. Woods-Humphery made a reply which was intended to be non-committal.

Mr. Woods-Humphery told the Board that this discussion had a very disturbing effect upon him and that he made, within three hours afterwards, a note recording his recollection of this part of the conversation.

In commenting on Sir Christopher Bullock's action, the Board states: "While we are not criticising his desire to link his future with that company" (Imperial Airways), "we think that the special and intimate relations subsisting at all times between the Air Ministry and the company made it intrinsically improper for him, in any circumstances, to initiate conversations with its chairman or any other representative of the company in furtherance of that desire. It was in our judgment more improper at the time he chose."

After referring to the Civil Service Code of 1928, extracts of which are given in an appendix to the Board's report, the report states: "We cannot escape the conclusion that Sir Christopher Bullock's conduct was at variance with the tenour and spirit of this code, which in our view clearly precludes a civil servant from interlacing public negotiations entrusted to him with advancement of his personal or private interests. We do not say that he consciously used his official position to further his interests; yet we cannot but think that it was the official position he held that provided the vantage ground from which he was able to press upon the representatives of this company personal suggestions which were as unwelcome as they were embarrassing.

Statement by Sir Chr. Bullock

On August 6, *Flight* received from Sir Christopher Bullock the following statement:

It is a time-honoured custom of Parliament to allow its Members the opportunity of making a personal statement. Others have no such facilities save by the courtesy of the Press—and to Civil Servants even these are not open until they have left the Service.

It would be both churlish and unprofitable to challenge the main findings of fact (or rather attempted reconstructions of conversations) by the recent Board of Enquiry, which showed me patience, consideration and impartiality. If their Report contains a few statements which I maintain are incorrect and, in consequence, some observations which are (to my thinking) scarcely fair; if, indeed, at one or two points the draftsman's pen has a barb, the fault no doubt lies with my inadequate elucidation in the later stages of galling and wearisome proceedings with which I had to cope single-handed. I have not disputed the main outlines of the conversations. Given certain not unimportant additions and omissions and a few changes of phraseology (more particularly in the case of the last two conversations) they accord broadly with my own recollection.

But what a world of difference is there between the give and take of living talk and the stale, dead ashes of conversations raked over and microscopically dissected after many months! The whole atmosphere and emphasis are changed; transitions from one topic to another which seemed natural enough at the time are lost or blurred; phrases taken from their context and subjected to frigid post-mortem are hardly recognisable; and, finally, the resuscitation in cold print of selected passages from three or four, out of perhaps three-score, conversations in the years under review in which I never raised the issue at all, inevitably distorts the whole focus.

Since the Report deals with a lengthy and complicated series of incidents, and many will only read the conclusions, I ask leave to stress five points:—

(i) The Board find that I "had at no time any intention of allowing the negotiations (with Imperial Airways) to be affected by any discussion of personal matters"; and ministerial testimony stated that I had "been active, assiduous and single-minded" in the State's behalf. The objects of the scheme which it fell to me and my staff to devise to solve a deadlock which was jeopardising the whole future of the great Empire Air Mail project were, firstly, to protect rigorously the public purse by the tightening-up of existing, and the incorporation of new, safeguards; and, secondly, to give Imperial Airways also some reasonable measure of protection, if events should prove that I had asked the impossible.

(ii) In considering myself being associated with Imperial Airways *at some indefinite future date years ahead, if and when I felt able to leave the Air Ministry*, the Board accept that I was influenced by the fact that civil aviation seemed a field in which my "experience . . . might best be utilised not only for my own advantage, but also in directions likely to be of service to the State." I showed in evidence that it was at the instance of friends with a special interest in, and knowledge of, these matters that I was first led to consider the possibility. Perhaps I may add, since there are always those who will whisper of mercenary motives, that I believe the remuneration of the Chairman of Imperial Airways is £2,000 per annum (or substantially lower than was my own), though I cannot be certain as I never sought to carry matters to a stage concrete enough for such factors to emerge clearly.

No Concealment

The Board record that I had "at various times . . . disclosed to Lord Londonderry, Lord Swinton, and Sir Warren Fisher something of my thoughts as to being associated at some future time with the management of the Company." That I did not specifically inform them that the Chairmanship was one possibility which I had in mind was due to the simple fact that, as I have said, I never attempted to carry matters to a sufficiently definite stage; as the Board state, I at no time sought any commitment. But there was no concealment and it was known to my friends (including three Ministers of the Crown) that I had in the past thought tentatively of the Chairmanship. I had long since informed one in particular, who was of ripe experience and familiar with the whole relations between the Air Ministry and Imperial Airways, that I had had one or two brief talks with Sir Eric Geddes on the subject. Bearing in mind (a) that Imperial Airways is in a very different position from an ordinary contractor, that the Company is a creation of the Air Ministry and administered in the spirit of a semi-public corporation, and (b) that there was no question of my seeking definite commitments of any sort or embarking on concrete negotiations for a connection with the Company, it never crossed his mind that there was any ambiguity or impropriety.

(iii) As the evidence showed, my friends well knew that I had

(*Continued on p.* 183)

THE FOUR WINDS

ITEMS OF INTEREST FROM ALL QUARTERS

A STREET in Paris is to be named after the late Louis Bleriot who died last Saturday week.

Mr. Whitney Straight has been granted a certificate of naturalisation by the Secretary of State.

It seems that Avions Fairey now refer to the single-seater fighter originally known as the Fantome as the Féroce.

Licences to search for oil in an area of nearly 500 sq. miles in southern England have been granted to the Anglo-American Oil Co.

A London to Singapore air race is planned to mark the completion of the new Singapore airport early next year.

Wife at Highgate police court: "My husband then got a job at an aeroplane factory, but that only landed him in the gutter again."

Mikhail Alexeev, a Soviet pilot, claims to have reached a height of more than seven miles in an aeroplane carrying a load of 2,000 lb.

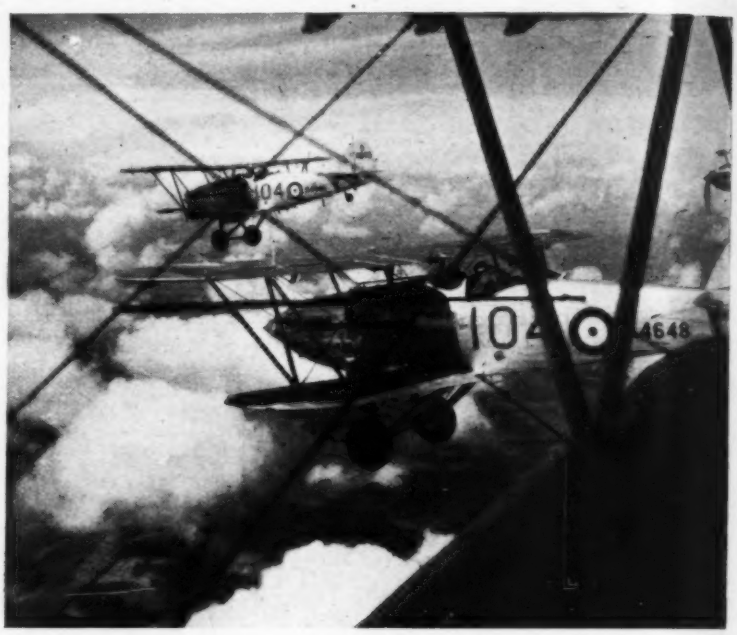
The eight occupants of a Lockheed Electra, of Chicago and Southern Air Lines, were killed when the machine crashed near St. Louis last week.

Two Russians, Sigismund Levanevsky and his co-pilot, Victor Levchanko, have left Los Angeles in a Vultee on a 10,000-miles flight to Moscow by way of Alaska.

The Soviet army claims that it has a "flying photographic laboratory" which enables aerial pictures to be taken, developed, and landed by parachute, all in 15 minutes.

While sitting in a seaplane, an officer of the French Air Force at St. Tropez, Riveria, was killed when the wind forced open his parachute and dragged him from the machine.

Mr. Bradford Washburn, leader of the National Geographical Society's Mount McKinley air expedition, reports that a successful flight has been made over Mount McKinley, North America's highest peak in Alaska, and both motion and still pictures have been made of the Alaskan summit. The mountain-top is 20,300 ft. above sea level.



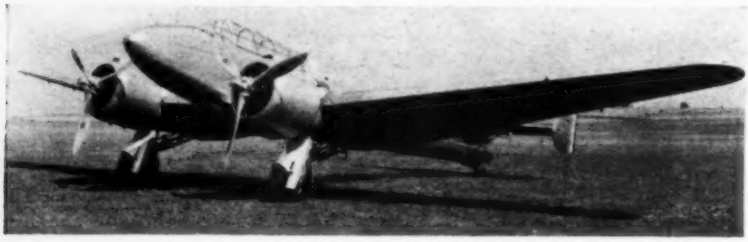
OPERATIONAL HEIGHT. Hawker Hind light bombers are now well established as Service equipment. Their engines—Rolls-Royce Kestrel Vs, which give a maximum of 640 at 14,000 ft.—permit them to operate efficiently at high altitudes where they can attain speeds up to 200 m.p.h. This "shot," secured during the recent exercises, depicts Hinds of No. 104 Squadron. Note, incidentally, the new "kidney" type exhausts and the "cut-away" gunners cockpits as on the Demon two-seater fighter.

Colonel Lindbergh, at a luncheon at Doeberitz, near Berlin, offered this toast: "To the bombers—may they always be slower. To the pursuit machines—may they always be faster."

A Croydon pilot, Captain P. C. Ginn, has set up a new air-mail record by flying 1,693 miles from Akyab, Burma, to Singapore, in nineteen hours. He stopped at Rangoon, Bangkok and Penang only long enough to disembark passengers and mails, and to refuel.

Mr. Richard C. du Pont, the American glider pilot, hopes one day to have his glider towed by a balloon to a height of from 60,000 to 70,000 ft., and then to cut loose so that he may glide to either coast, a distance of 1,500 miles. He is to study glider construction in Germany.

Mr. Clyde Pangborn, the American who was co-pilot with Roscoe Turner in the MacRobertson Race, will attempt to fly the Vance "Flying Wing" from New York to Paris and back to the United States in the immediate future. The machine has a petrol capacity of 1,156 gallons.



THREE-PLACE, THREE-PURPOSE. The first photograph of the new three-seater Potez 63 monoplane planned for fighting, bombing and observation. Two 670 h.p. two-row Hispanos are fitted and are believed to give a maximum speed of the order of 300 m.p.h. Basically the machine may be regarded as being in the same category as our Bristol Blenheim now in production for R.A.F. squadrons. So far as is known no order for the Potez has yet been placed by France.

Twenty-five Years Ago

(From "Flight" of August 5, 1911.)

"To the four Naval officers fell the honour of being the first British aviators to pilot machines carrying Royal passengers: Lt. Samson took up Princess Louis of Battenberg, Lt. Gregory was accompanied by Princess Henry of Prussia, and Lts. Longmore and Gerrard carried, respectively, Princess Louis of Battenberg and Miss Kerr, chief Lady-in-Waiting to Princess Louis of Battenberg."

LADIES' DAY at READING

The First Competition for the Northesk Cup : Tie Between Mrs. I. E. Fisher (Bournemouth) and Miss R. Moore (Brooklands)

AFTER a deal of discussion—originally opened in the Correspondence pages of *Flight*—the rules for the Northesk Cup ladies' competition were at last formulated a few months ago. These were arranged to be reasonably simple, in order that the competitors should not be unduly discouraged before future events, and the first competition was held last Saturday at Woodley aerodrome.

For a change, the weather was well-nigh perfect, and twelve ladies turned up to compete, the Brooklands Club topping the list with three entries: Miss R. Moore, Miss R. M. Cokayne and Miss B. Brice. Her Grace the Duchess of Bedford competed, unattached, and the other competitors were: Miss J. Hughes (Insurance Flying Club), Miss F. M. Buss (Reading), Mrs. E. Tuppen (Eastbourne), Miss L. M. Warner (Heston), Mrs. F. E. Pyddoke (Nottingham), Mrs. B. Macdonald (Lympne), Mrs. I. E. Fisher (Bournemouth) and Miss R. T. H. Wills (Cotswold).

The test was divided into five sections, which were marked in the air by F/O. J. Slade (an instructor at the Reading Reserve school), who flew as judge with all the competitors. Ten marks were awarded for the taxi out and turn into wind; ten marks for take-off and climb to 2,000 ft.; twenty marks for a complete 360-deg. turn to right and to left; thirty marks for glide down to 1,000 ft. and two figure of eight turns round predetermined points; and another thirty marks, making 100 in all, were awarded for a climb back to 2,000 ft., followed by a forced landing into the aerodrome circle. Each test took roughly 20-25 minutes, so we should imagine that F/O. Slade had had all the joy-riding he wanted for one day.

One of the brightest spots of a very pleasant afternoon was a tea party arranged for the benefit of the photographers. Two chairs, and four empty cups had to suffice for six ladies, and if Miss Moore, in the cockpit, had started her engine there would not have been any need to blow on the non-existent tea to cool it.

The standard of flying was very high indeed, and hardly any competitors failed to score less than seventy-five per cent. of the possible marks. In the end Mrs. I. E. Fisher and Miss R. Moore tied with a score of 82 marks apiece. As a result they were each asked to do a spot landing competition, which Mrs. Fisher won by a small margin. After the flying was over, Her Grace the Duchess of Bedford presented the cup and replica to Mrs. Fisher, whilst Miss Moore received a handbag as runner-up. Third place was jointly held by Mrs. Macdonald and Miss J. Hughes, with a score of 81 each.

During the afternoon an impromptu landing competition was held for others present, and this was won by Flt. Lt. Preston, private pilot to the Duchess of Bedford, with Mr. Fisher, of the Bournemouth Club, second.

Winner, second and co-third in the competition : In the cockpit of the Hawk Major is Miss Moore, while below can be seen Mrs. Fisher and Miss Hughes, who tied with Mrs. Macdonald for third place.

On the left is the Duchess of Bedford in the cockpit of her Gipsy Moth. F/O. Slade (right) acted as flying judge for a more or less solid five hours.

(*Flight* photographs.)

AN INDIAN TROPHY

A CHALLENGE trophy has been presented by the Marquess of Willingdon for the most meritorious flying performance during the year, carried out in any part of the world by any Indian national, or any person trained in India (and holding a current Indian licence) who has been resident in India for six months in the year for which the award has been made.

This trophy will be awarded by the Aero Club of India and Burma in the month of May for the performance carried out during the preceding calendar year, and the first award will be for 1936. The winner will hold the trophy for twelve months. Pilots should send in their applications to the Secretary, Aero Club of India and Burma, Ltd., New Delhi, India.

COMMERCIAL AVIATION

— AIRLINES — AIRPORTS —

GERMANY'S BIGGEST: Two years ago the site of the new Frankfurt airport, opened on July 8th by General der Flieger Erhard Milch, was virgin forest. This photograph shows the terminal building and something of the scene at the opening ceremony, with a Heinkel He 70 in the foreground.

THE WEEK AT CROYDON

Pieces of Eight : Traffic Terrific : First Class Navigation : Archæology : The Booking Anomaly

CROYDON has been stirred to its depth during the past week by mysterious doings connected with Spain. Rumours of heavily cloaked strangers with heavy handbags full of gold moidores and pieces of eight have thrilled us, and fabulous prices are said to have been paid for second-hand aircraft. Very little seems to have come of it, but any gentleman with an olive complexion and a Spanish "gold brick" in a bag would probably have done a roaring trade in the buffet, such was the credulity of the natives here.

Linked up with all this Spanish excitement was the sudden appearance of a Rapide with Italian markings (I-DRAG), said to be the property of a wealthy Italian private owner, which left Croydon for Paris one day last week. Its journey was probably most innocent.

Amazing passenger figures are being registered this summer in spite of the weather. The K.L.M. 7 a.m. service seldom carries less than twenty passengers, and on several days last week this rose to thirty-five or forty, necessitating duplicated services. The Basle-Zurich line operates fully booked all the time, too, and both Imperial Airways and Swissair have been duplicating services fairly frequently. At 1.45 p.m. on Friday last I saw no less than three Swissair Douglases lined up ready for departure (a pretty sight, by the way), and I understand that Imperials had three D.H.86 machines on the same route at 9.10 a.m. on Saturday.

In the recent examination for first-class navigators' licences, the successful people in which were given in *Flight* last week, Capts. A. S. Wilcockson and E. R. B. White failed in one subject each, which they are to take again. Altogether, Imperial have six first-class navigators, earlier successes in this very stiff examination being those of Capts. D. C. T. Kirton, who is out East, and J. Kirton.

As a matter of fact, all this abstruse mathematical stuff comes very hard on the senior men, whose genius in that direction has grown rusty. Some of them get their schoolboy sons to help them, whereas actually, like Kipling's marines, you can leave them alone on a bald man's head to paddle their own canoe or to navigate any aeroplane anywhere in the world. Incidentally, there are now some sixteen Master Pilots on Imperial Airways' staff, but that's another story and has nothing to do with the slide-rule. It is an award for being able to fly like a viard.

Not very long ago the "Blue Danube Air Express" carried to Croydon seven boxes containing 1,500,000 Hungarian wasps, which were despatched further by boat to Canada. They are needed there to combat some insect pest which wasps habitually feed upon. Another interesting consignment, this time from Scandinavia, was a pair of hawks of the type used for hunting. An American lady who got the wrong side of our "perfectly charming police" and was detained long enough to miss the connection at Southampton for the *Queen Mary*, 'phoned Imperials, who arranged for Surrey Flying Services to fly her to Cherbourg, where she caught the boat with plenty of time to spare.

Earth from the Antipodes

Levelling operations are still in full swing on the aerodrome, and much fun is had by all with a small railroad and a number of things which look like tanks. Part of the area being levelled is the presumed track of a Roman road mentioned in various text-books on the subject. Incidentally, there is a curious mound of earth near the hangars which must be the only soil of its kind in the country. Anyone taking Kipling's advice to "take of English earth as much as either hand may safely clutch" would probably find the resulting charm go badly away if this earth were used, for the pile consists of ballast emptied from French, Dutch, German, Belgian and Scan-

dinavian machines. In some of these bags the soil may have come from farther afield still, and maybe in time exotic plants will spring from that particular part of the aerodrome.

British Continental Airways have had heavy bookings on the Le Zoute run, and a D.H.86 has been transferred from the Stockholm route to help with the extra traffic. Capt. Hattersley has left Croydon for Liverpool, where he has started operating the Liverpool-Doncaster-Amsterdam route for B.C.A., this company having taken over the route by agreement with K.L.M.

Remarkable enterprise has been shown in the passengers' wash and brush-up accommodation at the airport, for the towels actually bear the initials E.R. Whether these have been in store since King Edward VII's reign, or even since Edward I's, is not known, but no mortal passenger can wipe his hand on them because they are highly glazed sail cloth, impervious to water. At a place like this there should be real soap (not globes full of frothing water), as well as nail-brushes, hair and clothes brushes, and really hot water—none of which exist. The authorities say that the staff remove these things, but the answer is simple. A big airport should have accommodation equal to that of a good hotel, which includes an attendant who, incidentally, could live largely on tips from grateful passengers accustomed only to nasty cuts on the fingers from prison-type towels made of starched oakum.

By the way, "Richard Carveth's" article on the railway clearing house scandal—and the leading article in the same issue of *Flight*—seem to have stirred things up. Half a dozen daily and Sunday newspapers have since commented on the absurd attitude of the railway people towards British air traffic companies. It was what was wanted because the public did not know about the situation—a state of affairs which suited the Brer Rabbit tactics of the railroad kings to perfection. A. VIATOR.

3,370 Passengers a Month

DURING July no fewer than 3,370 passengers were carried by K. L. M. to and from London, an average of between fifty and sixty a day in each direction. The separate figures were: Outgoing, 1,670 and incoming, 1,700.

Ceylon Still Waits

CEYLON may have to wait at least for a year before an air service, linking the island with the mainland, is inaugurated. Although the aerodrome at Colombo, recently enlarged and arranged with suitable runways, is almost complete, the new Empire air mail scheme may hinder the opening of the Indo-Ceylon service until the details of the scheme have been worked out.

West African Possibilities

READERS will recall that in last week's issue of *Flight* there appeared an article describing a 14,000-mile tour of West Africa, carried out on behalf of the Shell Company by Mr. W. K. Brett, flying a Percival Gull. An additional extract from Mr. Brett's report to the Company is worthy of quotation in these columns, as it neatly sums up the progress and prospects of commercial aviation in that area. The tour was made between October, 1935, and April, 1936.

Aviation in general in West Africa (writes Mr. Brett) is in a very much less advanced state than in East Africa. While in most towns of any size in British colonies on the east coast aero clubs have been formed (and for the most part are exceedingly well supported, encouraging many people to buy and operate light aircraft both for business purposes and for pleasure), in West Africa this is not so. At Brazzaville, in the French Congo, and at Duala, in the French Cameroons, are the only clubs in the part of West Africa which I visited. Each of these owns one machine only.

As regards regular airlines, a great deal more attention has been paid to their promotion and organisation in French and Belgian territory (where the natural difficulties and the fact that attention was concentrated on the eastern side of Africa have delayed their opening) than in the British colonies of West Africa. A good meteorological service has been established, and a great deal of thought and work has been expended on the provision of emergency landing-grounds.

In Dahomey, French Niger and the other colonies of French Equatorial and West Africa, emergency landing-grounds have been made following nearly all main roads, at an average interval of 30 km. On the main airline routes and where no roads exist the emergency landing-grounds follow some well-defined geographical feature, such as a river or a line of lakes.

The French and Belgian services from Europe to the Congo have been operated successfully for two years now, and Sabena holds a remarkably good record over a period of ten years.

In Nigeria, with the advent of the new Imperial Airways' West Africa service, the work involved in organisation has promoted a very great interest both in administrative and commercial circles. This colony, having delayed for so many years to provide any facilities for aircraft because no services were in sight, is now going ahead with great rapidity, and is producing a chain of excellent landing-grounds following Imperial Airways' proposed route to Lagos.

The Croydon Disaster

THE fact that the machine was being used only on experimental service slightly reduces the seriousness of the accident near Croydon airport on Monday morning. The machine, a Vickers Velox, came down from unknown causes almost immediately after leaving the airport at 2 a.m. and caught fire. The two pilots, one of whom had only recently obtained his first-class navigators' licence, and the two radio operators lost their lives; there was no mail or freight on board.

FOR TRUNK ROUTES. Douglas DC-3 monoplanes have been ordered by American Airlines, United Airlines, K.L.M. and T.W.A. For night operation, when the machine is usually known as the D.S.T. (Douglas Sleeper Transport), sleeping accommodation for up to fourteen passengers is provided. By day there are seats for twenty-four. The new Wright Cyclone Model G or the Pratt and Whitney Twin Wasp engines are variously specified. With Cyclone G2s, which are supercharged to give 850 h.p. at 5,800 feet the maximum speed is 213 m.p.h. The cruising speed at 10,000 ft. is 180 m.p.h. Structurally the machine is similar to the well-established D.C.2. Externally it may be distinguished from that machine by forward continuation of the fin.

Commercial Aviation

Ringway in the Spring

IT appears that part of Manchester's new airport at Ringway may be ready for use early next year and Fairey machines from the works at Heaton Moor will be the first to move thereon. A strip of the first 90 acres has been loaned to the company for testing purposes. However, the whole airport will not be ready before the spring of 1938 at the earliest.

A Few Figures

IN the résumé of commercial information recently published by the D.C.A., a number of interesting performance and load figures for the European air transport operating companies are given.

Great Britain, in the character of Imperial Airways, tops the list in the matter of available pay load for each machine. Probably to the surprise of many, the average cruising speed of the whole fleet is as high as 116 m.p.h., and, though twelfth among the operators in this respect, the figures given are, for the most part, not as high as might be expected. Swissair takes the lead with 163.5 m.p.h., with Roumania's S.A.R.T.A. second at 149 m.p.h. (with only one machine—a Potez 56), and D.L.H. third with 137 m.p.h.

As far as the weekly scheduled mileage for every machine is concerned, Imperial Airways are second only to Norway's D.N.L.—which suggests that the present fleet is being badly overworked in comparison with those of other operators. In scheduled weekly mileage, Imperials are fourth—D.L.H leading with 227,769 miles. All these figures are those obtained at the conclusion of last year.

SAFETY in the NORTH

Some Useful Information for those Flying in the Pennine Area

This information has been sent to us by Flt. Lt. S. H. Potter, the aerodrome control officer at Carlisle, and the matter therein appears to be of sufficient value, from the safety-first point of view, to merit publication in full.

THE recent accident to the two pilots of the Edinburgh Flying Club which occurred on Broad Law, North of Moffat, following closely as it did on the similar accident which occurred at Cross Fell, a high peak in the Pennine Range, near Penrith, prompts me to offer advice to pilots who have occasion to fly in these parts. My position at Carlisle means that any flight I make must be either across the hills or across the sea, and, as a result, considerable experience of flying conditions in these districts has been gathered.

I am of the opinion that, provided certain precautions are taken, and recommended routes followed, such flying need not be unduly dangerous even in conditions of poor visibility.

Direct flights across the hills on a compass course should only be made when the clouds are at a minimum height of 3,500 ft., and the visibility not less than two miles. At other times well-defined landmarks should be followed. It is extremely easy to get lost in the hills when the visibility is not too good, as there are dozens of valleys, all very much alike, running in various directions. These valleys usually decrease into gulleys, and finally stop altogether, when they run straight into the hill face.

Useful Landmarks

Roads, which normally are confusing landmarks for aviators, are extremely good in the hills, as the main roads are very few, and are easily distinguishable from other roads, these latter being mere cart tracks, and paths. Railways are very good too, and have the same advantage as the roads in that they usually follow the valleys and the lowest ground. Water is not very good. There are dozens of streams and small rivers, running in all directions close together; small lakes and ponds are too numerous, and are too similar to be of much assistance. Indiscriminate flying over the hills is to be discouraged, but there is no reason why a properly arranged cross-country flight from one aerodrome to another aerodrome on the other side of the hills should offer undue risk.

The following precautions should be taken:—

1. A favourable weather report should first be obtained from the aerodrome to be visited.

2. Unless the clouds and visibility are as previously stated, the course should lie along low ground all the way, and definite landmarks should be followed.

3. In the case of the weather deteriorating during the flight, it should always be possible to revert immediately to the procedure outlined in the previous paragraph.

4. On no account should the pilot climb into thick cloud and attempt to fly above a bad storm.

5. Should the cloud be down on any high ground directly on the course, and the pilot cannot fly round, the flight should be abandoned, and the machine turned about. Care should be taken to see that no bad weather comes in behind to prevent the pilot retracing his steps. In most of the valleys there are many small fields and clearings where a light aircraft could be landed with little damage.

Many of the storms encountered in the hills, while they are intense, are of short duration, and it is the writer's experience on several occasions that it has been possible to circle a clearing in the valley until the worst of the storm has passed, when the flight can be continued. I am assuming, of course, that the machine is a small, privately owned or club aircraft and is not fitted with wireless.

It may be of interest, and possibly of assistance, if I give the routes I recommend in poor conditions between the principal centres.

RENFREW—CARLISLE.

Leaving Renfrew Aerodrome, follow the railway from Barrhead down the valley to Dunlop, Stewarton, Kilmarnock, Cumnock, New Cumnock, Sanquhar, Thornhill, Dumfries, Annan, Carlisle. I have flown this route in extremely bad conditions with the visibility almost zero, and the cloud base about 400 ft., and found no real difficulty. Care is required between Sanquhar and Thornhill, where the hills are close together, and the valley, and consequently the railway twists and turns for three or four miles. Between these points the railway enters a tunnel about one and a half miles in length, but at the entrance to the tunnel a road is followed which brings one back to the railway line about eight miles on.

This route avoids all the high ground except perhaps between Cumnock and Thornhill, and even around Sanquhar the hills divide out considerably, and there are several fields suitable for landing light aircraft.

PRESTWICK—CARLISLE.

From Prestwick the railway can be followed to Cumnock, when the same course as from Renfrew is taken to Carlisle.

EDINBURGH—CARLISLE.

From Tranent or Turnhouse follow a course avoiding the hills to Corebridge, where the railway is picked up and followed via Fountainhill, Galashiels, Melrose, St. Boswells, Hawick, Riccarton Junction, Newcastleton, Longtown, Carlisle. Perhaps the worst part of this route is at Sandy Edge where there is a ridge, and the railway enters a short tunnel of half a mile. If the weather should close down when in the Hawick district, the machine can be headed east for the coast, along the railway via Greenlaw and Duns.

NEWCASTLE—CARLISLE.

From Woolsington Aerodrome the railway line is followed along the Tyne valley via Hexham, Haltwhistle, Brampton, Carlisle. This is the easiest of the hill courses, as no really high ground is flown over, even when on a compass course. At Carlisle we frequently fly this route, and generally use it when instructing pupils in navigation.

CARLISLE—CATTERICK.

Follow the railway line from Carlisle via Kirkoswald, Appleby (leave the railway at Warcop, and continue over Brough and rejoin the railway just beyond Barras), Barnard Castle, Catterick.

CARLISLE—BLACKPOOL.

Follow the railway line from Carlisle via Penrith, Shap (in very bad weather follow the railway through the valley at Tebay), then right towards Kendall, Canforth, Lancaster, Blackpool. In fairly good weather, after leaving Shap, the road can be followed over Shap Fell to Kendall, thus cutting off a corner. This route is also recommended for most destinations to the south and south-west. In very bad weather it is usually better to leave Carlisle, strike for the coast at Workington and follow it to Millom, cutting inland here to avoid Morecambe Bay, then south.

We at Carlisle are always ready to give help to any pilots requiring information regarding the north country hills, and any such are urged to get in touch with the aerodrome.

OLYMPIC AERONAUTICS

Rallies, Aerobatics and Ballooning in Germany

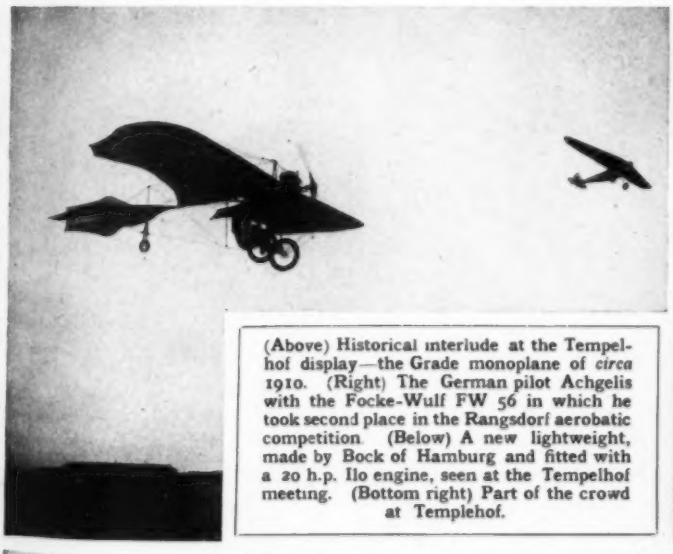
SOME striking glimpses of aeronautical events held in connection with the Olympic Games appear on this page. Apart from a balloon race and air display at Tempelhof, two rallies were held, one open to foreign pilots and the other for Germans. For the first, 57 entries were received from 16 countries, of which 47 arrived at the rallying point at Rangsdorf, the new airport situated 20 miles to the south of Berlin.

As reported in *Flight* last week, there were four English participants: Messrs. Henry Deterding (Miles Falcon), Geoffrey Linnel (D.H. Hornet Moth), William Humble (D.H. Leopard Moth) and Roger Frogley (Stinson), and they were among the first to arrive. In the rally competition two Pragas from Czechoslovakia gained the highest points.

The conditions for the national rally were more difficult than for the international one, the competitors being required to land at a large number of aerodromes, many of a small and difficult nature. The winner was Capt. Speck von Sternburg in a B.F.W. Me.108.

Fourteen competitors took part in an international aerobatic contest, which was won by the German pilot Stör who, flying a B.F.W. M.35, won from one of his countrymen. In the "free style" section of this competition Stör was only sixth, the winner being Count Hagenburg (Focke-Wulf F.W.44), who had not done better than eighth place in the obligatory section of the competition.

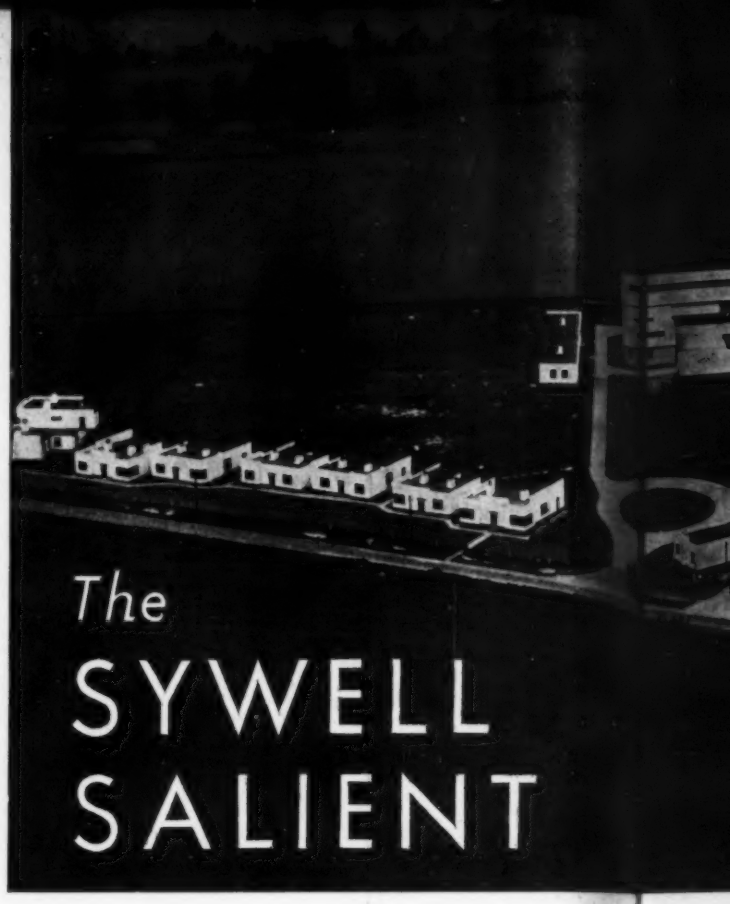
Obsolescent but picturesque—the Olympic balloon race at Tempelhof Airport.



(Above) Historical interlude at the Tempelhof display—the Grade monoplane of *circa* 1910. (Right) The German pilot Achgelis with the Focke-Wulf FW 56 in which he took second place in the Rangsdorf aerobatic competition. (Below) A new lightweight, made by Bock of Hamburg and fitted with a 20 h.p. Ilo engine, seen at the Tempelhof meeting. (Bottom right) Part of the crowd at Templehof.

A Visit to the Civilian Training School at Sywell, Northampton : Some Sound and Novel Methods

Illustrated by "Flight" Photographs



THE civilian training schools scheme which the Air Ministry recently adopted for converting raw material into trained pilots on *ab initio* types of aircraft has now been in operation for little over a year. It was predestined to success as a scheme, and not the least attractive feature of its planning is the fact that the individual training centres were given general instructions and allowed a comparatively free hand to carry them out. Different schools, different methods, and at Sywell the scheme of training was launched under the auspices of the "parent" aerodrome at Brooklands, where Captain Duncan Davis has already enjoyed success in flying school work.

Broadly, the Air Ministry set the following standards of training to be completed in two months. The *ab initio* pilot had to pass out with fifty hours flying, which had to include advanced training of all degrees. On the ground he was required to have had satisfactory instruction in the elements of airmanship, air pilotage and maps, rigging, engines, armament, photography, and parachutes. Of these subjects a written examination had to be passed in all except the armament and photography and parachutes, which were oral.

Passing out in flying came as a test by an officer from the staff of the Superintendent of Reserve at Hendon These officers exercised an invigilating system of control over the aerodromes, and in the case of a doubtful pupil his flying would be tested by such an officer and a recommendation for the pupil's future sent to the Superintendent.

Remote Control

This control, though remote, has proved very satisfactory. It has relieved the training schools of a great deal of responsibility and unnecessary nursing, and at the same time has ensured that the right type of pilot is coming to the Service.

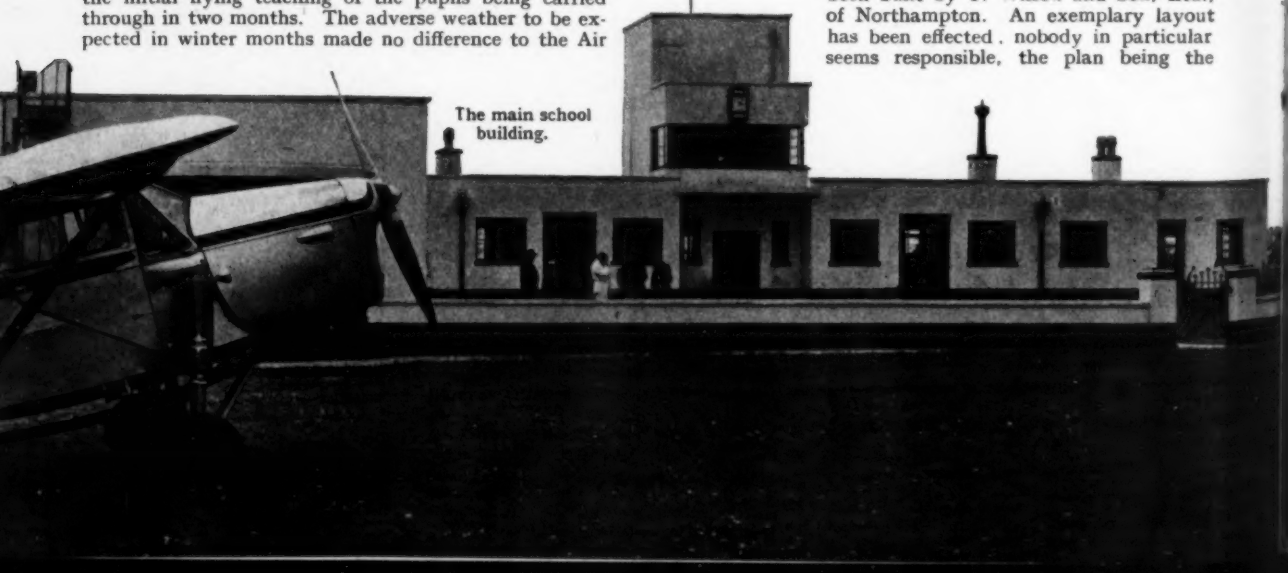
The basic idea of an intensive training is logically carried out. There are no distractions from drill or orderly duties, and parades are limited to P.T. The result is that in two months the new-style pilots are nearly as fully trained as the former pilots were after twelve. The new pilots pass on to the Flying Training Schools of the R.A.F., and at the end of one year after their entry they are fully fledged Service pilots, with a sound working knowledge of all Service functions. The old system meant that a pilot began his training after he left his school, and it was often two years before he became in any real sense effective in his squadron.

The problem facing the training schools was to ensure the initial flying teaching of the pupils being carried through in two months. The adverse weather to be expected in winter months made no difference to the Air Ministry's requirements. A condition of the qualified free hand was that the training should be done in the stipulated time. Some schools could not help but be in arrears, but on the whole the results have been highly satisfactory.

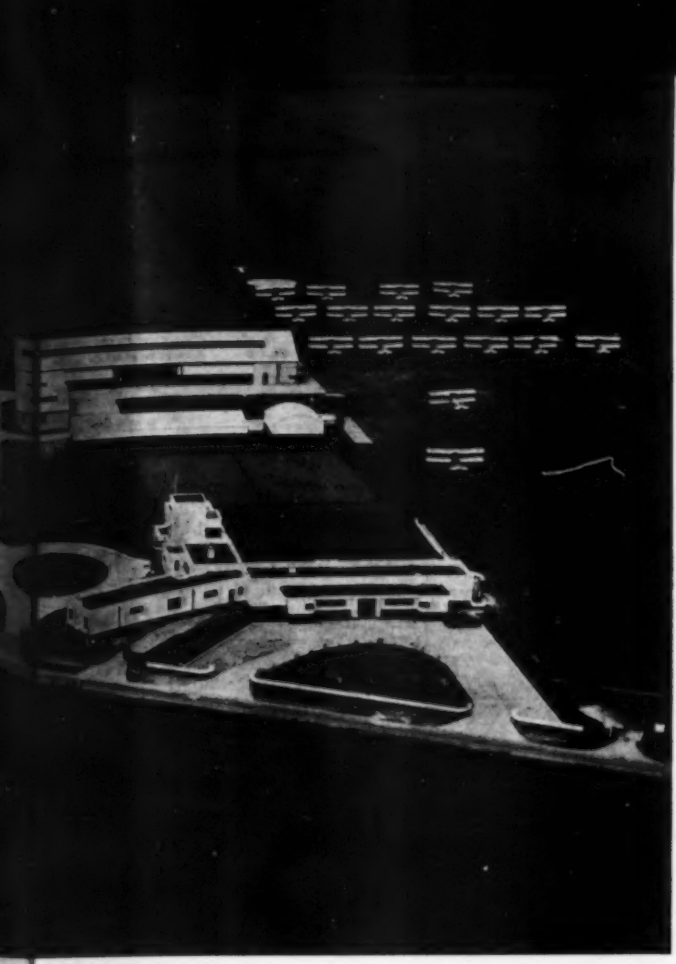
Sywell Aerodrome, Northampton, started its career as a training school for Service pilots on June 11, 1935. Those who remember Sywell as a small aerodrome situated in the heart of England, patronised by a few exclusive private owners, will be most astonished at the improvement which has resulted from the R.A.F. expansion scheme.

The landing ground is considerably enlarged and is now 160 acres in extent. The run is 950 yards in any direction, though the ground slopes slightly to the north. This length of run is emphasised by there being an uninterrupted approach on all sides. No tall hangars or wireless masts obstruct the path, no trees on the boundaries or ditches across the middle limit the scope, and the finished job made of this rejuvenated aerodrome reflects great credit on the En-Tout-Cas Company, which carried out all the work on the new part.

Prior to the training school's arrival, the aerodrome had twelve lock-up garage hangars. Facing these, new accommodation has been built by T. Wilson and Son, Ltd., of Northampton. An exemplary layout has been effected, nobody in particular seems responsible, the plan being the



The main school building.



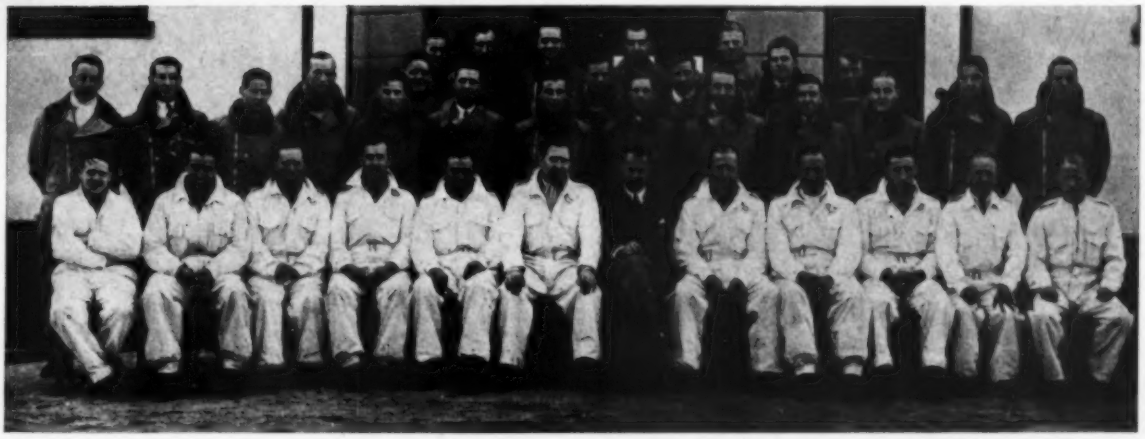
this layout, the parachute packing section has been built over the stores offices. This space, which elsewhere is rarely used and always inaccessible, provides an apt instance of intelligent forethought.

In the timekeeper's office the arrangements are equally admirable. One door gives on to the aerodrome, the other to the serviceable aircraft hangar. Seated at his desk, the timekeeper can see all his charges, whether on the aerodrome or in the hangar. It would be difficult to think of a more sensible site. As for the internal plan of this office, unqualified praise must be accorded Mr. C. Bancroft, the chief engineer, who has evolved a time-keeping system *par excellence*.

Briefly, this system is as follows. Each aircraft has a slot box for its log-books, and all the slot boxes are ranged along the wall. On the front of the box is a card marked like a clock to show up to sixty hours. The dial of this artificial clock is marked in tens of hours, and red lines give warning of the appointed times for inspection. In the centre of the clock is pivoted a single arrow hand, whose revolutions record the time flown, and whose movement is controlled by a nut at the pivot. This nut can be tightened so that no accidental movement of the arrow hand can take place.

As a result, not only can a vivid impression be gained of the state of an aircraft's time, but the position of the whole school can be seen in a glance. The usual system of chalk marking on a blackboard is not to be compared with this, and the sequel of recording is: flying sheets to log books to schedule cards (the coined name of these "clock" cards).

Before leaving the aerodrome mention must be made of a very valuable accessory which contributes largely to the



(Above) Sywell instructors (in white) and pupils. In the centre are Flt. Lt. Ian Mackenzie (chief flying instructor) and Capt. Duncan Davis (managing director). (Below) The Club lounge.

outcome of a series of conferences in which all interested parties got together and co-operated to secure economy with efficiency.

These new buildings are on the south side of the aerodrome in a compact unit. The school operates with twenty-one Tiger Moths, and all these are accommodated in one hangar running north and south. The south and aerodrome end of the hangar is crossed T-fashion by several offices: stores, parachute section, pilots' rooms, and timekeeper's office. The result of this concentration is that no time is wasted, for instructors, pilots and aircraft are all on the spot. It should be impossible for those required for flying to be out of hailing distance.

This centralisation of units provides all the advantages of that system. As an example of one of the many saving ideas incorporated in

smooth running of this school. This is a mobile refuelling and defuelling unit made by Thomson Bros. (Bilston), Ltd., and its record speaks for itself. The Sywell School can refuel their twenty-one Tiger Moths in forty-five minutes. The unit holds 600 gallons of petrol, and there is room to stow away an oil drum.

Adjacent to but apart from the main hangar is a small three-berth hangar used for engine repairs and airframe work. Here are executed only top overhauls, the major work being effected at the "parent" aerodrome at Brooklands. Captain Davis's system is to have always a complete engine as stand-by. The "old" is flown to Brooklands and taxied directly to a point beneath a hoist which is run out from a first floor engine shop. The "old" engine is lifted thus straight from airframe to bench, and immediately afterwards a "new" engine is lowered into position. The major overhaul thus becomes actually a replacement, rendering the aircraft unserviceable for not more than one day. So simple, but, compared with some systems, so advanced.

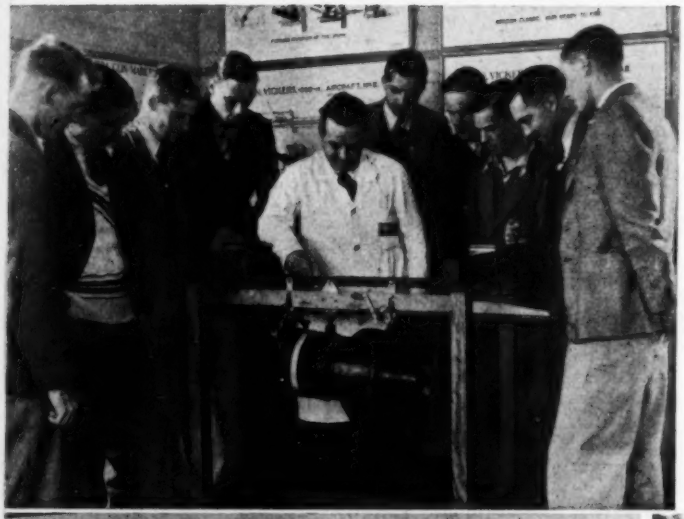
Behind both these hangars, and farther south, are the lecture rooms, with full provision for the standard curriculum to be carried out. This site enables lectures to be given with a minimum of noise interference; there is no question of an aeroplane distracting by running up, or blowing dust into the rooms. Armament is taught by Mr. R. Hadland, pilotage and rigging fall to Mr. F. C. Squibb, and photography and parachutes go to Mr. J. Lindsay. The whole ground staff comes under the chief flying instructor, Flt. Lt. Ian W. C. Mackenzie, who left the R.A.F. in 1929, and who bears the brunt of the responsibility for the successful running of Sywell School.

The almost universal system of dividing the pupils into two classes also obtains at Sywell. When one class flies the other has lectures, but flying takes precedence all the time. Incidentally, the mole drainage of the aerodrome prevents delays from wet-weather bogging.

The Pupils' Quarters

Flanking the lecture rooms, the pupils' accommodation is situated on the road front. Some idea of the desirability of Sywell School may be obtained if all preconceived notions of Army huts and converted sheds are ruled out. The architects, Sir John Brown and A. E. Henson, of 83, St. Giles Street, Northampton, and 1, Old Burlington Street, London, have erected entirely new accommodation, quite dissociated from any form of barrack, and in the small villa style. The quarters are detached bungalows of concrete facings and designed in the modern and harmonious manner. Each villa has five rooms and a bathroom, and airmen and officers are segregated as far as possible. The whole presents a most agreeable prospect of white and red villas looking on to a fresh green communal garden.

From these desirable quarters to the mess is but a few paces, so different from the route march undertaken by the pupils at many schools. The pupils' mess is actually a new wing attached to the former club-house, and is divided into an airmen's mess and a pupils' and instructors' mess. The interior decoration, effected by Bentall's, is cheerfully modern. The decor is in orange, green, and fawn, and the ensemble is more of a country club than a training establishment. Mess customs are observed, and a president and vice-president are appointed from the



Some scenes in the Sywell School: (from the top) aerial-camera instruction; an armament lecture in progress; whys and wherefores of the carburetter in the classroom; and the system by which the maintenance schedule of every machine is available at a glance

instructors for dinner. Guest night takes place once a week, but in a mess as well built and as well appointed is this the temptation to perform the customary (if declining) ceremonies of breaking up the furniture could only be prompted by vandalism · though, perhaps, iconoclasm is nearer the word.

One feature of this mess is the private ante-room allotted the instructors. This very sixth-form and prefectorial reservation can only be described as appreciated by all parties

Just over a year after the initiation of the school there are twenty-three pupils doing the training course at Sywell. Three fell by the wayside, but three trainees are also present. There are eleven instructors under the watchful eye of Flt. Lt. Mackenzie and the remote control of Capt. Davis.

The art of building aerodromes is, at best, a very new one, and the risk of having any temporary accommodation flung up in a hurry is very large. All the more congratulation must be conceded to the architects and their builder, T. Wilson and Son, Ltd., of 65-67, Sheep Street, Northampton, who have really made a good job of this aerodrome. One would like to see more of their cheerful and vigorous work, for the impression is that this new broom will sweep just as clean when it is old.

The school at Sywell is, of course, but one-half of that aerodrome's activities. There is a very active civil side, whose members jealously announce that the next highest land east is in the Ural Mountains. A Klemm aeroplane was distinctly seen approaching from that direction. . . .

The club-house is separated from the school wing by the kitchens, and it is even better appointed than the school. One unusual feature is the bridge room, in which a dart board is hung. The significance of this was not explained, but, as the darts had to be thrown over the heads of the card players, one side at least would get what was coming to them.

The Club, the school, and the whole aerodrome owes much to Major G. R. D. Shaw, M.F.H., whose plans in the past and hopes for the future unite to make Sywell a place of coming importance. Squash courts, a swimming pool, and further villas are contemplated, and there is no reason why Sywell should not wax in popularity. It lies between three active towns: Northampton, Wellingborough, and Kettering. It is the obvious aerodrome for the manufacturer of the future, and sites exist on the aerodrome boundaries for manufacturers. There are no restrictions against building here, and development may be expected in the near future.

Lord Willoughby de Broke, M.C., is the president of the Northamptonshire Aero Club, and Major Shaw is the chairman of the committee. Capt. Sir Peter Grant-Lawson is a distinguished member. Sywell Aerodrome, Ltd., has the valuable services of Mr. C. M. Newton as its secretary.

B. J. H.

SIR CHR. BULLOCK'S STATEMENT

(*Continued from page* 177)

some time since decided that "the present pressure on the Air Ministry made it impossible for me to consider an early departure from the Service, wherever my personal interests lay." I may say that they also knew that I had, for other reasons, ceased for some months past to think of the Chairmanship at all, even as an ultimate future possibility.

(iv) It appears to me a new (and not very heinous) crime in the Calendar for A, having felt it necessary to raise a confidential and urgent matter with B owing to C not being available, to ask that B should say nothing to C, because A "*wished to mention it himself in the first instance and proposed to take an early opportunity of doing so*" on C's return. The words italicised are taken from the evidence of the witness for the prosecution and seem to me to make all the difference.

(v) The Board expressly state that they do not suggest that I "consciously used my official position to further my interests." I can only add that I failed altogether to appreciate from the attitude of those concerned that all mention of a possible connection with the Company *at some indeterminate future date years ahead* was either embarrassing or unwelcome to them, and that this was to me a complete surprise to me. Misunderstanding is easy, but for this I must bear the main responsibility.

It is a painful wrench to undergo such rude severance of a connection of twenty-one years, for it was in 1915 that I was originally seconded from the infantry to the old Royal Flying Corps, first as observer and later as pilot, and I have served the Force and the Ministry ever since. My co-workers will, I trust, concede that, whatever my shortcomings (and I know they are many), I have striven hard for the well-being of the Service with which I have had the honour to be associated. Some day the history of these arduous years will be written and the outstanding achievements of men like Lord Trenchard and Sir Samuel Hoare—if I do not mention others, and in particular their successors who have since carried the torch, it is only to save space—will be seen in true and enduring perspective. It was a privilege to serve under them; to render some modest help in the great work accomplished in the teeth of public apathy and every sort of obstacle and difficulty; to see the structure of the new Force steadily taking shape until it now stands firmly four-square to the winds of heaven and grows from strength to strength; to be in the midst of great events, of which I am proud to think *pars parva fui*.

I do not seek to burke responsibility for consequences which have flowed from my own actions. But it is easy to be wise after the event; and fortunate is he—be he politician, sailor, soldier, airman, journalist or Civil Servant—who can honestly say that, if every private and informal conversation he has held were sifted and resifted months, even years, afterwards in the rarefied atmosphere of a solemn and formal inquisition, no passing phrase uttered in an unguarded moment could be held injudicious, no word or deed be called in question in some degree by absolute standards of taste or propriety. Whatever judgment your readers may pass on my mistakes, I hope they may be charitable enough to temper it with that reflection.

London, S.W. C. LL. BULLOCK.

PEACE

Vital Peace. A Study of Risks. By Henry Wickham Steed. (*Constable and Co., Ltd.*, 10s.)

Mr. Wickham Steed, towards the end of this book, writes that "fear of aerial attack with poison gas and incendiary bombs has given the spur to thought upon non-war and has clothed it with feeling." He makes a great distinction between peace and non-war. Non-war is not enough, he says. The world must wage peace, for it is a great adventure.

One gets a little impatient with the egotism of this book, with the stories of the advice given by the writer to various statesmen of different countries, and with the lamentations because the world has got itself into a mess through not following the writer's advice. None the less, it is a fine piece of philosophical writing, and the writer's call for an active world peace is all the more telling because of the fairness with which he examines all the pleas put forward for war as a human institution. For pacifists he displays the greatest contempt. No pacifist will enjoy this book, but they all ought to read it.

Forthcoming Events

August 15. Eastbourne Flying Club: "At Home."
August 15-30. Yorkshire Gliding Club: Open Meeting and Competitions.
August 16. Royal Naval Flying Club: "At Home," Portsmouth Airport.
August 22. Midland Aero Club: "At Home" and Contact Air Race.
August 28-29. Southend Flying Club: Week-end "At Home."
August 29-30. Cinque Ports Club: International Rally and Wakefield Cup Race.
August 29-Sept. 6. British Gliding Association: Annual Competition, Gt. Hucklow, Derbyshire.
August 30. Gordon Bennett Balloon Race, Poland.
September 4-5. Magyar Athletic Club Motor Section: International Flying Meeting.
September 5. Bristol and Wessex Aeroplane Club, and Bristol Branch, R.Ae.S.: Garden Party.
September 5-6. Aero Club of Hungary: Week-end Aerien.
September 12. London Aeroplane Club: Hatfield Garden Party.
September 13. Aero Club de France: Coupe Deutsch Race.
September 19. Cardiff Aeroplane Club: London-Cardiff Race.
September 20. London Air Park Club: Display.
September 29. London-Johannesburg Race.
October 25. Aero Club de France: Saigon Race.
November 13-29. International Aero Exhibition, Paris.

Private Flying

Topics of the Day

Power for the Featherweight

THE time has come, I feel, for someone in this country to produce a little engine which, from the drawing board to the test bench, has been designed simply and solely for aeroplane work by someone who has discarded all preconceived road or racing ideas.

It should develop its maximum power at 2,500 r.p.m., or less, and be of suitably sturdy construction. At this low engine speed there is no need to worry much about intake and scavenging efficiency and there is no earthly point in using ultra-high compressions, high-lift cams or any of the nonsense to which engine speeds of 6,000 r.p.m. and more have accustomed the motor cycle designer. The engine should, however, have two plugs per cylinder and dual ignition.

Long ago, at the time of the Lympne trials, it was realised that the high-efficiency motor cycle engine could not be adequately modified for flying use and the immediate result was the production of the simple, sturdy and somewhat unexciting Cirrus I engine. There was nothing "high-efficienty" about this unit; but it did its work, was reasonably smooth and economical, and was supremely reliable—which was more than could be said for the engines at the trials.

Silence and Reliability

IF there are any factors which are liable to kill the ultra-lightweight idea once again, these concern the power unit alone. Even the most enthusiastic owner is not going to suffer indefinitely either the noise of a pneumatic road breaker (with comparable vibration) or the unreliability of a sprint-racing vehicle. And by the word unreliability I do not mean sudden failure in the air, but only those trivial failures which keep one fiddling on the ground when one should be flying.

My experiences with even the most charming of baby aeroplanes (I do not include those larger babies whose motors have had the "bugs" taken out and are in any case true aero engines) have been somewhat spoilt by the, perhaps, unfounded fear that "something must go," and by the need for constant "blipping" during the glide, if an oiled-up plug is to be saved.

Given a smooth, quiet and well-made engine, this ultra-light aviation is going to remain with us as the greatest fun in the world. Given excessive noise and minor unreliability, it will disappear again as surely as it has arrived. A few people will play with the machines, but the "A" licence pilot who cannot afford to buy or to run a full-sized machine will still not bother with them.

Achilles' Heel

SO many of the people who fly or manufacture full-sized light aeroplanes are inclined to scoff at the little fellows. In particular, they hoot with laughter when the owner of an ultra-light machine produces a length of cord or belt, proceeds to wind it around the airscrew hub and to pull.

Let me assure these superior people that it is safer and simpler to start an engine by such means, and remind them that their worthy aeroplanes, costing anything from £500 to £1,000 more, are also started by hand and at grave risk to life and limb. Even if, at the expense of financial ruin, one fits a self-starter, it is still necessary to prepare the cold engine, with muscular efforts, for its feeble ministrations. Do I swing my car before using the starter? Do I think always that the battery must be conserved? No, I have a dynamo and the battery is well up to its work—weight being no object. These faults are unfortunate inevitabilities, but they should discourage the manufacturer of "real" aeroplanes when he is inclined to look down his nose at some quaint little affair with a length of starter cord in its luggage locker.

Artificial Invisibility

PRESENTLY, one imagines, the human being will become socially conscious enough to be prepared to give up the doubtful comfort of the private coal fire. It appears to me that the airman may be the final cause of its demise in certain over-inhabited areas.

Ever since the day when I viewed the city of Newcastle-on-Tyne as a conical heap of yellow smoke I have felt that the private coal fire, whether used by a family or a factory, is the most anti-social feature of modern town life. Someone must burn something, of course, but a large power station will always find that it pays to deal with the smoke on economic grounds and the conservative home-lover will eventually discover that coal-burning, as a means of obtaining warmth, is really rather wasteful.

That conical heap was a very effective demonstration, but more effective still was the sight, on one Sunday morning of high wind, of a couple of million chimney pots in a very large town belching forth smoke of all colours and consistencies. I was flying down-wind and the smoke partially obscured the ground for thirty miles.

Only once, on a hot summer's evening, have I seen the whole of London from the air, never have I seen Birmingham (though for nearly three years I flew at irregular intervals in the vicinity) and never have I seen Manchester save once from Barton's air as a single white sunlit building in a blue-grey haze.

Pilots who have seen the pock-marked, murky areas of the Black Country are the people to demand an industrial clean-up on a grand scale. Those areas, which were once rolling woodland and heathland, look as if a war has been fought there and the armies had passed on with the customary neglect of the comfort and happiness of those unfortunates who must live in a scarred, discoloured and desolate area. Man is surely the arch-villain of nature's little piece, but grass and trees will still grow when he has extinguished himself in a welter of bloodshed and filth.

INDICATOR.

FROM the CLUBS

Events and Activity at the Clubs and Schools

INSTRUCTIONAL FLEET: Now that the London Aeroplane Club have obtained their new D.H. Dragonfly for twin-engined training their instructional fleet is one of the most complete in the country. In this *Flight* photograph there will be seen the Dragonfly, two Hornet Moths and five of the six Tiger Moths. In the foreground (though not to be recognised) are Messrs. Rodwell, Harris, Goodyear and Maclaren, respectively secretary, chief instructor and assistant instructors.

PORTSMOUTH

THE weather was responsible for the low total of 25 hr. flying last week. Mrs. B. B. Thornton became a member. It was not possible to hold the monthly landing competition on Sunday, August 2, because of the weather.

REDHILL

Last week, during which the Tipsy was demonstrated, six new members were enrolled and Mr. Hermann went solo. The flying time was 67 hr. 20 min.

YORKSHIRE

Flying time on club aircraft totalled 55 hr. 55 min. last week. The Western brothers paid a "flying visit" to Yeadon last week. One of them is a qualified pilot.

DONCASTER

High winds and rain prevented flying on three days, but club machines put in 24 hr. during the week ending August 7. Messrs. E. Bannister and R. E. Knox became members.

NORTH BRITISH

During the early part of the week the weather limited, and at times, prohibited, flying, but it soon gave way to perfect conditions. Mr. J. Stott is continuing his instruction. Mr. Brooke-Smith brought up a Falcon from Reading. Social activities are increasing.

C. A. S. C.

Members are to report for duty at Portsmouth aerodrome next Sunday in connection with the Royal Naval Flying Club's garden party. Last week end 12 hr. 25 min. flying was logged. This included a formation cross-country to Ashingdon. Mr. R. A. Carter passed his "A" licence tests.

HANWORTH

Mr. J. H. Hill flew Cdr. Perrin to Berlin in the club's Leopard Moth to see the opening of the Olympic games. Flt. Lt. Tommy Rose also hired the Leopard and Lord Carlow the Monospar to fly to France and Belgium. The Monospar was also commissioned by Mr. Coborn, of music hall fame, for a trip on the occasion of his 84th birthday. With him were Mr. Harry Champion and Mr. Mozart.

NORTHAMPTONSHIRE

The holiday weather has had an adverse effect on flying hours at Sywell, although Mr. A. J. Spiller managed to make his first solo and Mr. Warren commenced flying instruction. Mr. J. Jeyes returned from Le Touquet on Wednesday after an enjoyable flying holiday in the Puss Moth. Major G. Shaw, the chairman, is in camp with the 5th Btn. K.O.Y.L.I. at Catterick and has had his B.A. Swallow flown up to him. The club tennis courts are in process of being relaid by En-Tout-Cas and will be out of commission for a week.

LEEMING

Messrs. King-Clark, Frisby and Woodhead went solo a fortnight ago. Mr. Stephenson completed the tests for his "A" licence and Messrs. C. G. Briggs, S. Stubbs, W. H. Hardcastle and L. M. Storey became pupils. The flying time for July was 344 hr. 40 min.

LIVERPOOL

For the week ending August 8 the flying time by the Liverpool and District Aero Club was 78 hr. 5 min. The figure for July was 248 hr. 40 min., bringing the total time up to July 31 this year to 1,632 hr. 30 min. The Club is now re-equipping with Tiger Moths for training purposes.

CAMBRIDGE

Messrs. Buchanan, Skinner and Carter, of the C.A.S.C., have passed their "A" licence tests and Mr. Worsdel, the technical examination for his "B" licence. Flying times at Marshall's Flying School, the Cambridge Aero Club and the University Aero Club totalled 108 hr. 45 min. during the week ending August 8.

LEICESTERSHIRE

Flying times were well maintained during July in face of unfavourable weather. Miss Julian Brassey and Messrs. H. W. King, F. R. Wragg and E. M. Frisby went solo. The following became pilot members: Miss J. Brassey, Messrs. E. M. Frisby, Lord Allerton, H. W. King, F. W. Wragg, A. S. Carter, A. J. Russell and A. J. Stirrat.

SOUTH COAST

Appalling weather did not prevent some 30 hr. flying of Club machines last week. On one very rough day which stopped nearly all flying there was a demonstration of the Drone and a few members were able to fly it early on Monday morning before the gale. A landing competition held last Sunday was won by Mr. Head, with Mr. D. Brown and Mr. E. Parker second and third respectively. The first round of the Gorringe Challenge Trophy forced landing competition started on Sunday.

CINQUE PORTS

The Cinque Ports Flying Club logged 293 hr. during July, which is a satisfactory figure for such a stormy month. Last week, much to everyone's surprise, they achieved a record week's flying with 111 hr. and had a record day on Wednesday with 28 hr. No. 601 Squadron is now encamped on the aerodrome close to the Club so a great deal of flying and rabbiting is going on. The new Club offices, lounge, lecture room and pilots' office are now completed. Preparations for the International Air Rally to be held on August 29 and 30 are now well advanced, and the programme, which includes tied-together aerobatics by a flight of No. 19 Squadron led by Flt. Lt. Broadhurst, contains some novel and amusing events. Col. Ward and Surg. Comdr. A. W. Y. Price, and Messrs. Baillie, L. A. Temple, J. Scholes, F. H. C. Taylor and D. J. Ward have become members.

Private Flying

HULL

Messrs. A. E. Banks and A. E. Purdie went solo during July, while Messrs. R. H. Walker, A. Myers and D. Hellyer passed their "A" licence tests. The indisposition of aircraft limited the flying total to 186 hr. The Super Drone will be demonstrated soon. The Tipsy was shown off recently.

READING

Eighty-five hours' flying was recorded by the Reading Aero Club last week. New pupils are Mrs. Brady, Mr. Tyson and Mr. Van Deurs. Mr. Douglas Fawcett has been staying in the Club for the past seven weeks renewing his licence on a Hawk Major. Miss Robinson and Mr. Houlding, from Rangoon, are also renewing their tickets.

YAPTON

No less than 158 hr. 25 min. flying was put in during July by the Yapton Aero Club. During the first eight days in August 60 hr. 50 min. flying was logged. New members are Messrs. Edward Paget (a private owner), Ali Effat, R. F. Wills and John Berrow. Capt. George Eyston has brought his Hornet Moth to the Club and is keeping it in the hangar. Mr. M. S. Freeman has gone solo and Mr. R. Compton-Hall is taking an "A" licence.

NORFOLK AND NORWICH

In spite of the fact that, owing to the holidays, there was no flying for the first two days of last week, 62 hr. were flown in Club machines. A large portion of this total was done by the boys attending the Third Public Schools Aviation Camp which opened last Wednesday. This figure constitutes a record for the year, but it is still far short of last year's record, which passed the century. However, with the improving weather, there is every hope that a new record will be set. F/O. M. Bircham obtained his instructor's licence last week at Brough, and has joined the staff at Mousehold aerodrome.

Most of the boys attending the Camp have arrived, but there are still four boys to come this week. Of the first arrivals, one, Mr. R. A. Kirkwood, of Dover College, has already succeeded in making his first solo. Mr. J. Korndorffer (K.C.S. Wimbledon) and Mr. A. Meredith-Owens (Rossall), who, like Mr. Kirkwood, also attended last year's Camp, and who are renewing their licences, have also gone solo. In the ordinary course of Club flying Messrs. T. Manning and F. R. Davy passed their "A" licence tests. Mr. P. George has joined the Club as a flying member.

NOTTINGHAM

The total flying time at Tollerton for the week ending August 6 was 22 hr. 45 min. Mr. P. P. Bradley and Mr. G. S. Anderson joined as flying members. There were fourteen visiting aircraft.

MIDLAND

Mr. W. H. Lord and Miss E. H. M. Thorneycroft joined as flying members and Mrs. K. M. Parkes as an ordinary member. The flying times for the week ending August 7 were 21 hr. 10 min. dual and 23 hr. 10 min. solo and passenger.

BROOKLANDS

The new Weir "jump-off" Autogiro was demonstrated at the August Bank Holiday meeting. The machine was placed at the fork with its wheels not more than five yards from the inside banking and made a clean jump into the air of about 25 ft., clearing the telegraph wires and boundary of the track. Mr. Ortega has bought a Miles Hawk. Pressure of work has compelled the service department to work overtime at week ends. Messrs. A. Creedy, M. C. Seymour, Mr. Dumesnil and Dr. R. P. Booth have become members, while Messrs. Colby and May have made their first solos.

WEST MALLING

During July the Club aircraft flew 70 hr. and there were two first solos, one by Mr. C. E. Mercer and the other by Mr. Humphery Dade, who is, incidentally, the fourth brother of Mr. John Dade, the club instructor at West Malling, to learn to fly. The large service hangar under construction will be ready for use this month. Owing to the unpopular cold front masquerading as summer weather the squash court has been much appreciated not only by members, but by those from other clubs who are always welcome, though a booking of the court by telephone is advisable.

BRISTOL AND WESSEX

Arrangements for the Club Garden Party on September 5 are well in hand and manufacturers are giving support by sending demonstration machines. An arrival competition will be open to all aircraft arriving between 12.30 and 2.30, and there will be a bombing competition for pilots of club aircraft. Last week's flying total was 24 hr. 20 min. The figure for July was 106 hr. 30 min. Mrs. H. R. Wheeler, Messrs. J. G. Davidson and R. A. Barnwell and Mr. and Mrs. W. J. R. Syng have become members. Mr. J. S. Hobhouse has gone solo. Messrs. R. Dyer, W. R. Maunder, E. W. Butler and J. H. Lewis have completed their "A" licence tests.

The London-Johannesburg Race

FOR the London-Johannesburg race, which is due to start on September 29, the Royal Aero Club has received the following entries:—

Entrant.	Pilot.	Aircraft.
Len Coates	Capt. A. H. Miller...	Percival Mew Gull.
Capt. S. S. Halse	Entrant	Percival Mew Gull.
Victor Smith	Entrant	Miles Sparrow Hawk.
Henry S. Horne	Flt. Lt. T. Rose ...	B.A.4.
Lt. Misri Chand	Entrant	Percival Vega Gull.
Sir C. Guthrie	—	Percival Vega Gull.
D. W. Llewellyn	Entrant	Percival Vega Gull.
F/O A. E. Clouston and F. E. Tasker	F/O Clouston ...	Miles Hawk VI.
De Havilland Aircraft Co....	H. Buckingham ...	D.H.92 "Dolphin."

The closing dates of entries have been extended to August 14 at ordinary fee, and August 28 at double fee. The turning point in Europe will be Belgrade and not Vienna. The selection of the starting aerodrome has not yet been made; the finishing point at Johannesburg will be the Baragwanath aerodrome.

The Royal Air Force Club

THE secretary of the Royal Air Force Club announces that the Club premises will be closed for repairs and redecorations from noon on Tuesday, September 1, until noon on Thursday, October 1.

Members will be the guests of the Cavalry Club, Junior Naval and Military Club, and Connaught Club.

Letters, etc., usually collected by members of the Club may be called for at the Cavalry Club. Other letters, etc., will be redirected as members may require.

About an Air Ambulance

ENTITLED "Pioneers," an extremely well illustrated and informative brochure, dealing with the Monospar Ambulance, has been published. The completeness of the list of aeronautical equipment is only rivalled by that of the medical and surgical equipment carried on board. Those interested may obtain the brochure from General Aircraft, Ltd., London Air Park, Feltham. The title "Pioneers," incidentally, is an allusion to Florence Nightingale and to the machine, the first one of which was named after her.

Deauville-Cannes-Deauville

THE third annual Grand Prix of the Aero Club of France was flown over the course Deauville-Cannes-Deauville on Saturday and Sunday, July 25 and 26. The machines took off from Deauville at 1 o'clock on Saturday and on arriving at Cannes remained there until the same time on Sunday, when they took off again for Deauville.

Fairly good weather favoured the race, which was won by Maurice Arnoux at an average speed of 192 m.p.h. He piloted a new Caudron low-wing monoplane, type 684, designed by M. Riffard as an open cockpit military trainer but arranged as an enclosed two-seater for the occasion. A Renault 170 h.p. six-cylinder inverted direct-drive engine was fitted. Arnoux thus won the cup presented by M. Armand Esders, president of the Deauville Aero Club, to the pilot making the best time during the three past annual contests, each of which also carried a cash prize of 200,000 francs.

Eight machines entered the race, one of which remained at Cannes. The finishers and their speeds were as follow:—

Pilot.	Machine.	Engine and h.p.	Average Speed.	
			m.p.h.	km/hr.
Arnoux ..	Caudron 684 ...	Renault (170)	192.0	307.73
Boris ...	Caudron Rafale	Do.	168.5	269.53
Trivier ...	Do.	Do.	155.0	248.27
Massotte	Maillet-Lignel...	Regnier (180)	150.5	240.78
Clement...	Do. ...	Do.	146.7	234.75
Denis ...	Caudron Aiglon	Renault (100)	130.5	212.09
Nouve ...	Do.	Do.	126.4	202.26

A Percival Mew Gull, to be piloted by Guy de Chateaubrun, was also entered for the race, but arrived at the Deauville control station on the day before the race just ten minutes too late to qualify.

Strange and Straight

HIS many friends at home and abroad will be interested to learn that Col. L. A. Strange has resigned from the board of Spartan Aircraft, Ltd., and Spartan Air Lines, Ltd., and has joined the board of the Straight Corporation, Ltd.

THE ROYAL AIR FORCE

SERVICE NOTES AND NEWS — AIR MINISTRY ANNOUNCEMENTS

R.A.F. COLLEGE INSPECTION

Marshal of the Royal Air Force Lord Trenchard inspected the R.A.F. College, Cranwell, on the occasion of the passing out of Flight Cadets. Below are given some points from the report of the Commandant, Air Vice-Marshal Cave-Browne-Cave, D.S.O., D.F.C.

There are 130 Flight Cadets at the College. Since the formation of the College, including the term now passing out, 785 Flight Cadets have graduated.

Twenty-eight Flight Cadets have finished their flying training at the Royal Air Force College this term, of whom one is an Indian Cadet, five have been selected for fighter squadrons, five for light bomber squadrons, four for heavy bomber squadrons, five for army co-operation squadrons, five for flying boat squadrons, and three for torpedo bomber squadrons. Cadets passing out have averaged 80 hr. 50 min. dual and solo on service type aircraft and 161 hr. 20 min. on all types during the course. Those Flight Cadets selected for fighter squadrons have been trained on Furies, the others have all flown Harts. Those selected for flying twin-engined aircraft have received a short period of instruction on Valentias at the Electrical and Wireless School.

The staff of the Central Flying School made their annual inspection this term and reported that the methods of instruction and average skill were satisfactory.

Instrument flying is progressing satisfactorily. Previously this form of training was confined to the IV Term, but it is now given progressively throughout the Cadet's training.

Advanced training has included formation flying, climbing to 16,000 feet and diving at ground targets. Formation flying has shown distinct improvement. Night flying will be a normal part of cadets' training, as soon as the equipment is available.

There have been no fatal accidents, but there have been six accidents through errors of judgment whilst practising forced landings, which resulted in damage to aircraft, but no permanent injury to personnel.

Anti-gas instruction has been continued. All Flight Cadets have been equipped with respirators and have passed through the gas chamber.

During the period under review the total number of Cadets admitted to hospital was sixty, as compared with thirty-seven during the corresponding period of last year.

The analysis of admissions to hospital is: Flying accidents 1, motor car accidents 4, motor-cycle accidents nil, accidents in organised games 4, miscellaneous illnesses 49, miscellaneous accidents 2.

Fifty-four meets of the Beagles were held this season. Severe weather caused many meets to be cancelled. Recent alterations to the syllabus, which involve extra work, have curtailed the time available to Cadets for this sport, and although a fair number attended the meets regularly when they could, and showed keenness, it was decided that the Cadets could not take a sufficient part in this sport to justify the expense of keeping a pack. The pack has been sold, and a riding school started instead.

The riding school, opened this term for Flight Cadets, has five horses, one of which is being presented by the Old Cranwellian Association. The instructor is a retired warrant officer riding instructor from the Cavalry. Cadets of the second year received approximately two hours' riding instruction a week. Great keenness is shown in this instruction, which is voluntary.

The College has accepted with gratitude the Royal Air Force uniform of His late Majesty King George V which has been presented by Their Majesties Queen Mary and King Edward VIII.

AWARDS

His Majesty the King's Medal, presented to the Flight Cadet who obtains the highest aggregate of marks in all subjects in the final order of merit following the passing-out examination, has been awarded to Flight Cadet Douglas Andrew Kerr.

The Sword of Honour, presented to the best all-round Flight Cadet in the Senior Term, has been awarded to Flight Cadet Under Officer Paul Burton Chamberlain.

The Air Ministry Prize awarded to the Flight Cadet in the Senior Term obtaining the highest marks in English and History has been won by Flight Cadet Sergt. Victor Charles Darling.

The Air Ministry Prize awarded to the Flight Cadet in the Senior Term obtaining the highest marks in Aeronautical Engineering has been won by Flight Cadet Sergt. Darling.

The Abdy Gerrard Fellowes Memorial Prize, for the Flight Cadet obtaining the highest marks in Mathematics and Science, has been awarded to Flight Cadet Kerr.

The J. A. Chance Memorial Prize, for the Flight Cadet in the Senior Term obtaining the highest marks in Service Subjects, has been awarded to Flight Cadet George Burges.

The R. M. Groves Memorial Prize, for the best all-round pilot in the Senior Term, has been awarded to Flight Cadet Sergt. Robin Peter Reginald Powell.

ELECTRICAL AND WIRELESS SCHOOL

Air Vice-Marshal J. E. A. Baldwin, D.S.O., O.B.E., inspected the Electrical and Wireless School, Cranwell, on the passing out of aircraft apprentices. The following are points from the report of the Commanding Officer, Group Capt. H. Gordon-Dean, A.F.C.

The original strength of the entry now passing-out was sixty. These were allotted trades as follows: Wireless operator mechanics, 52; instrument makers, 8. One under training wireless operator mechanic was discharged as unsuitable for training, and two were discharged on medical grounds.

The forty-nine apprentices under training as wireless operator mechanics have obtained the following results:—Two have qualified as Leading Aircraftmen, 16 as Aircraftmen 1st Class, 26 as Aircraftmen 2nd Class, two apprentices have failed to qualify, and three have not yet been examined owing to absence in hospital.

The eight apprentices under training as instrument makers have qualified as follows:—One as Leading Aircraftman, two as Aircraftmen 1st Class, four as Aircraftmen 2nd Class, and one has not yet been examined owing to absence in hospital.

CADETSHIPS

Cadetships at the Royal Air Force College have been awarded to:—

Corpl. Apprentice Eric Orwell Porter.
Sergt. Apprentice Edwin Mackenzie Burt.

AIR OFFICERS COMMANDING-IN-CHIEF, HOME COMMANDS

With effect from July 14, the Air Officers Commanding the Bomber, Fighter, Coastal and Training Commands assumed the title and status of Air Officers Commanding-in-Chief.

A NEW SYMBOL

The initials "i.d.c" have been inserted after the names of officers of the R.A.F. in the *Air Force List* to denote those who have completed a course at the Imperial Defence College, or who have held an appointment as Commandant or Instructor at the College for a period of one year.

CENTRAL FLYING SCHOOL CATEGORIES

The undermentioned officers and airman pilots have been recategorised as under:—

A.2 to A.1

Sergt. Gillie, G.B.

B. to A.2

Flt. Lts. A. C. Mitchell, H. F. Chester, D. Addenbrooke, H. R. A. Edwards, W. E. Hooper, and G. W. M. Ling, Sergts. Forster, W. H., Hickman, A. A. F., Jobbins, L., Alexander, R., Burke, R. G., Holt, F., Simmons, W. H.

The undermentioned officer has been granted category "C":—F/O. W. P. Harvey.

USE OF NEW AERODROMES

The aerodromes at Driffield, Finningley and Wyton may be used with effect from July 4, and Scampton with effect from August 4, for aircraft of personnel visiting the stations on duty in connection with the opening. Only aircraft fitted with tail wheels are permitted, and no facilities of any kind are available. These aerodromes will not be available for general use until September 3, nor that at Scampton until October 6.

THE LATE M. BLÉRIOT

The Secretary of State for Air and the Air Council have sent messages of condolence on the death of Monsieur Louis Blériot.

IMPERIAL DEFENCE COLLEGE

The following officers have been selected for the next course at the Imperial Defence College commencing in January, 1937:—Group Capt. K. R. Park, M.C., D.F.C., Wing Cdrs. J. O. Andrews, D.S.O., M.C., A. H. Orlebar, A.F.C., H. W. L. Saunders, M.C., D.F.C., M.M., A. L. Fiddament, D.F.C., Sqn. Ldr. A. B. Ellwood, D.S.C.

WINGS FOR MEDICAL OFFICERS

An amendment to the King's Regulations provides that a medical officer permitted to qualify, or an officer of the general duties branch to whom permission to qualify may be accorded by the Air Ministry in special circumstances, will be authorised to wear the flying badge on a certificate being rendered that he has passed the following tests:—(*a*) Has completed within a period of not more than 18 months 60 hours' dual and solo flying on an elementary or service type landplane of which not less than 30 hours was solo flying; (*b*) is able to fly a landplane reliably and accurately, execute correctly the evolutions of normal flight and land consistently well at low speeds; (*c*) is able to execute forced landings successfully; (*d*) has carried out accurately at least one triangular cross-country flight of not less than 150 miles; (*e*) has flown successfully in rough weather and through clouds; and (*f*) has climbed to 10,000 ft. and remained there for 20 minutes. Officers of branches other than the general duties and medical branches will not be permitted to receive flying instruction on service aircraft.

THE OBSERVER CORPS

A number of retired officers have now been appointed in a civilian capacity as "group assistants" to the controllers of the various groups in the Observer Corps.

The list of such appointments to date is as follows:—No. 1 Group, Lt.-Col. P. Bamford, O.B.E., T.D.; No. 2 Group, Lt.-Col. W. G. Moore, O.B.E.; No. 3 Group. Col. J. Hodgkinson; No. 4 Group, Brigadier L. P. Collins, C.B., D.S.O., O.B.E.; No. 12 Group, Col. T. S. Cox; No. 15 Group, Major G. E. Fowler; No. 16 Group, Capt. R. G. Kerrison; No. 17 Group, Lt.-Col. J. M. G. Taylor; and No. 18 Group, Commander R. Harter, R.N.

R.A.F. BENEVOLENT FUND

The usual meeting of the Grants Committee was held at Iddesleigh House, on Monday, July 13. Mr. W. S. Field was in the chair, and the other members present were: Mrs. L. M. K. Pratt Barlow, O.B.E., Air Comdre. B. C. H. Drew, C.M.G., C.B.E., and Group Capt. C. H. K. Edmonds, D.S.O., O.B.E. The Committee made grants to the amount of £610 6s. 5d.

AIR FORCE LIST

The August issue of the *Air Force List* has now been published. It can be purchased (price 2s. 6d.) from H.M. Stationery Office at the following addresses: Adastral House, Kingsway, London, W.C.2; 120, George Street, Edinburgh; 2, York Street, Manchester; 1, St. Andrew's Crescent, Cardiff; 15, Donegall Square, Belfast; or through any bookseller.

ROYAL AIR FORCE GAZETTE

London Gazette, August 4

General Duties Branch

The following Pilot Officers, on probation, are confirmed in rank, with effect from the dates stated:—J. A. O'Neill (May 29); J. L. M. Bell (June 4).

The following Flight Lieutenants are promoted to the rank of Squadron Leader (August 1):—G. C. Shepherd, W. Wynter-Morgan, M.C., I. A. Bertram, M. B. Mackay, R. A. R. Mangles, F. G. S. Mitchell, L. Young, A. W. Bates, W. R. Day, W. J. M. Akerman, B. V. Reynolds, F. H. Woolliams, R. Y. Eccles, R. O. Jones, R. H. Carter, A. D. Davies, G. H. Randle, V. Croome, E. H. M. David, N. C. Ogilvie-Forbes, P. J. A. Hume-Wright, C. S. Riccard, F. E. Watts, H. M. A. Day, A.M., E. C. Delamain, M.C., R. H. Haworth-Booth, D.F.C., V. B. Bennett, R. B. Jordan, G. E. Nicholetts, A.F.C., F. J. Fressanges, N. A. P. Pritchett, C. B. Greet, W. L. Payne, N. Carter, D.F.C., M. H. Garnons-Williams.

F/O. C. G. R. Lewis takes rank and precedence as if his appointment as Flying Officer bore date April 3. Reduction takes effect from July 21.

Stores Branch

Flt. Lt. A. H. Allan is promoted to the rank of Squadron Leader (August 1).

Accountant Branch

The following Flight Lieutenants are promoted to the rank of Squadron Leader (August 1):—H. E. Cardwell, A.F.C., H. A. Murton, W. J. Heneghan.

PRINCESS MARY'S ROYAL AIR FORCE NURSING SERVICE

Sister Miss R. F. Beech resigns her appointment (July 30).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Group Captains.—A. R. Arnold, D.S.C., D.F.C., to Headquarters, No. 24 (Training) Group, Halton; for duty as Senior Air Staff Officer, 10.7.36. Hon. L. J. E. Twisleton-Wykeham-Fiennes, to Headquarters, Armament Group, Eastchurch; for duty as Senior Air Staff Officer, 24.7.36.

Wing Commander.—R. G. Gardner, D.S.C., to Headquarters, R.A.F. Mediterranean, Malta; for duty as Senior Air Staff Officer, vice Wing Cdr. E. L. Tomkinson, D.S.O., A.F.C., 28.6.36.

Squadron Leaders.—M. W. C. Ridgway, to Headquarters, R.A.F., Mediterranean, Malta; for Personnel Staff duties vice Sqn. Ldr. F. E. Vernon, 22.6.36. G. H. Stainforth, A.F.C., to Aircraft Depot, Hinaidi, Iraq, 1.7.36. J. C. Barraclough, to Headquarters, Training Command, Market Drayton, 27.7.36. T. A. Warne-Browne, D.S.C., to R.A.F. Station, Gosport; for Torpedo Instructor duties, 20.7.36.

Flight Lieutenants.—C. J. W. Hatcher, A.F.C., to Air Armament School, Eastchurch, 20.7.36. D. W. R. Ryley, to No. 2 Armament Training Camp, North Coates Fitties, 27.7.36. P. Slocombe, to Marine Aircraft Experimental Establishment, Felixstowe, 20.7.36. J. Constable-Roberts, to R.A.F. Station, Gosport, 20.7.36. A. J. Brister, to Headquarters, No. 23 (Training) Group, Grantham, 21.7.36. G. F. Wood, to Central Flying School, Upavon, 24.7.36. H. H. Martin and W. N. H. Banks, to No. 206 (G.R.) Squadron, Manston, 19.7.36. G. K. Fairtlough, to No. 801 (F.F.) Squadron, 22.6.36. P. F. G. Bradley, to Aircraft Depot, Karachi, India, 6.6.36. R. Costa, to Headquarters, R.A.F., India, Simla, 17.6.36. A. F. Hutton, to No. 28 (Army Co-operation) Squadron, Ambala, India, 20.6.36. C. H. A. Stevens, to Communication Flight, Hinaidi, Iraq, 11.6.36. J. L. F. Fuller-Good, to No. 1 Armoured Car Company, Hinaidi, Iraq, 11.6.36. A. A. Adams, to D. of P., Dept. of A.M.P., Air Ministry, 27.7.36. H. A. Purvis, to Experimental Section, Royal Aircraft Establishment, South Farnborough, 27.7.36.

Flying Officer.—W. A. Theed, to R.A.F. Station, Ramleh, Egypt, 2.7.36.

Pilot Officers.—T. M. Evans, J. V. Hoggarth and T. M. Lockyer, to No. 206 (G.R.) Squadron, Manston, 19.7.36. P. M. Hamilton-Hall, to No. 18 (B) Squadron, Bircham Newton, 20.7.36. R. N. Keeble, to No. 15 (B) Squadron, Abingdon, 20.7.36. G. F. Lerwill, to No. 102 (B) Squadron, Worthy Down, 20.7.36. O. R. C. Moseley, to No. 40 (B) Squadron, Abingdon, 20.7.36.

Acting Pilot Officer.—P. H. Leyton, to No. 5 Flying Training School, Sealand, 13.7.36.

Pilot Officers.—H. R. Larkin, to No. 36 (T.B.) Squadron, Singapore, 18.7.36. R. W. G. Kitley, to Station Flight, Andover, 25.7.36.

Acting Pilot Officers.—J. Avent, H. R. Bickerstaff, J. A. J. Boardman, G. R. Brady, D. F. H. Brown, H. D. Card, S. G. Cooper, R. C. Cox, D. T. St. H. Dawes, A. A. Devany, J. Ellis, S. Gemmell, R. S. Illingworth, R. B. Langlois, F. T. May, A. M. M. McKenzie, A. C. MacLaghlan, H. G. Marriott, G. W. Parsons, S. C. Pendred, T. G. Robertson, G. F. Rodney, D. D. Rogers, G. E. Saddington, J. M. W. Savory, K. M. W. Savory, W. S. L. Smallman, D. C. Stapleton, P. B. Unitt, G. P. Westropp-Bennett, and E. T. Williams. All to No. 5 Flying Training School, Sealand, 14.7.36.

Stores Branch

Flight Lieutenant.—J. E. R. Sowman, to Headquarters, R.A.F., Middle East, Cairo, Egypt; for Equipment (Stores) Staff duties, 3.7.36.

Flying Officers.—J. R. Fraser, to Aircraft Depot, Karachi, India, 1.7.36. W. Macey, to Headquarters, R.A.F., India, Simla, 15.6.36.

Accountant Branch

Wing Commander.—W. G. W. Prall, to R.A.F. Depot, Uxbridge; for Accountant duties, vice Group Capt. J. Rylands, 20.7.36.

Flight Lieutenant.—K. A. Jackman, to R.A.F. Station, Singapore, 17.7.36.

Medical Branch

Wing Commander.—C. P. Barber, to Headquarters, Training Command, Market Drayton; for duty as Deputy Principal Medical Officer, 20.7.36.

Squadron Leaders.—G. M. Anderson, to No. 6 Flying Training School, Netheravon; for duty as Medical Officer, 26.7.36. A. A. Townsend, to No. 7 Flying Training School, Peterborough; for duty as Medical Officer, 28.7.36.

Flight Lieutenants.—M. T. O'Reilly, to R.A.F. Station, Worthy Down, 24.7.36. C. H. Smith, to R.A.F. Depot, Uxbridge, 24.7.36. R. Thorpe, to R.A.F. Station, Heliopolis, Egypt, 24.6.36.

Flying Officer.—A. B. Marshall, to No. 45 (B) Squadron, Hebran, Egypt, 24.6.36.

Dental Branch

Flying Officer.—J. H. G. Fensom, to R.A.F. Station, South Farnborough, 30.7.36.

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases, accompany letters intended for publication in these columns

THE BOOKING ANOMALY

HAVING read Mr. Eric W. Walford's letter published in a recent issue, it has occurred to us that your readers may care to know that we possess at our headquarters just such an information bureau as that for which he so aptly states the necessity.

We are always pleased to supply detailed information about airline services to all parts of the world. This deals with every service in operation. In addition, we can also supply information on any other subject of aeronautical interest to all those who communicate with us by letter, or by 'phone at Mayfair 2921/4. T. D'ARCY-NASSAU, CAPT.

Information and Flying Instruction Dept.,
The National League of Airmen,
39, Grosvenor Square, London, W.1.

CROYDON AMENITIES—ABSENCE OF

I WONDER if other people having occasion to visit Croydon airport think, like myself, that a good deal could be done to improve the amenities for the public.

On the night of Thursday, July 30, I had occasion to meet a young relative who was arriving from Paris on the 'plane in at 9.15 p.m. It was a very cold night with a drizzling rain. I saw my relative alight from the plane and go into the Customs, so I went to the exit of the Customs, where the Imperial Airways coach was drawn up, and walked in to meet him. Instantly I was stopped by a policeman who told me that admission was forbidden. Other people received the same information.

As it was a cold and rainy night one had either to wait out in the wet or else to go round to the booking hall, the latter procedure meaning that one would miss the passengers, as there was no way open on that occasion between the Customs and the booking hall.

May I suggest that it would be a convenience for people meeting incoming travellers, especially when these are youngsters, if a barrier could be put across the Customs Hall and those meeting the travellers were allowed to wait behind the barrier. There is ample space for this, and structurally there does not appear to be the slightest reason for such a course not being adopted

Furthermore, may I suggest that something is done to indicate at night where the entrance and exit of the Imperial Airways booking hall are in relation to the road. I defy any stranger coming along at night not to either miss them completely or to take the wrong one.

A simple neon sign at each gate would make the matter easy, particularly for those approaching from London, when it is necessary to give clear signals at the correct moment in order to cross the incoming road traffic. M. S.

London, N.W.

STALLING

I AM indebted to Mr. Andrews and Mr. Needham for their criticisms, comments and suggestions regarding my stalling experiments and the theory that I advanced. I had hoped, by now, to have completed several further experiments aimed at establishing the theory more definitely, but some of the photographs taken of one machine from another are not good enough for reproduction, and weather conditions and the unavailability of the desired machines have delayed the repetition of the work. I regret this delay as I have obtained several interesting photographs but it is hoped to sum up the remaining aspects of the study in an early issue of *Flight*. In the meantime, I shall try to deal briefly with the points raised so far.

Taking Mr. Andrews' letter first: The N.A.C.A. scheme of altering the section towards the tip is rather reminiscent of a Hawker patent of 1928, except then it was there proposed to alter the section rather abruptly on the outer part of a wing; so far as I am aware there are no full-scale or model published results on this. The more gradual change of section used by the N.A.C.A. seems preferable, and is reported to give good flying qualities; there have, of course, been various gradings of section used or proposed in the past. It would certainly be interesting if Mr. Andrews could give us some model or full-scale results of his plan—especially rolling balance model tests.

Regarding the N.P.L. experiments by Mr. Irving, I agree with Mr. Andrews that everyone will await with interest the publication of the full results; but without wishing to be unkind to the Aeronautical Research Committee, one cannot help observing that the accent is so very much on his word "awaits."

I agree with Mr. Andrews that my method of flying a wing in yaw is not strictly accurate, especially as—as I pointed out—the fuselage wake due to the yaw affects the flow over the wing; but my tunnel tests on whole wings with yaw and half-wings with various sweeps were in substantial agreement, which leads me to think that my tests by sideslipping the aeroplane are reasonably valid. If this is so, the justification is speed—it is so easy to kick the rudder, so slow and expensive to build a special machine—especially one with variable sweepback and C.G.!

Light on Stalling

With regard to the theory that I put forward, I certainly never imagined that all previous theories of stalling have been in error—I merely hoped that I had thrown a little more light on the subject; stalling is obviously dependent on section. (Nor did I suggest that my experiments were "remarkable"—readers must blame that on the Editor.) Mr. Andrews looks upon the bending as part of a circulation, but the only part that appears to affect the stall—and therefore stability and safety—is that on the upper surface towards the T.E.: wing sections with a "front stall" should, and apparently can, be avoided, otherwise any bending near the L.E. would be of interest also.

I do not think that anyone would be justified for a moment in jumping to the conclusion—as Mr. Andrews seems to fear—that the T.E. angle is the *only* important factor in stalling, and I do not think I have said anything to encourage such a jump.

I now turn to Mr. Latimer-Needham's letter: his suggestion for varying the sweep of the L.E. and T.E. in turn and then in combination seems rather unworkable, for if the aspect ratio remains constant the taper ratio keeps altering with sweep, and I do not see how he can disentangle the effects due to each of the two variations; as the aspect ratio and taper ratio are probably dictated to a great extent by structural and performance considerations, it seems much more sensible to choose these first and then vary the sweep.

Lateral Flow

Mr. Needham then says that a lateral flow above the wing must be accompanied by an opposite flow below, but the relatively shallow layer of air that I have been concerned with is of so little mass compared with the air affected by the wing that I hardly think his remark really applies; any bending on the undersurface will be due to pressure variations there and not to the fact that there is bending above. I do not see why bending of the lower flow should affect lift measurably—perhaps he can elaborate the point.

I do not think that he is right in suggesting that mere lateral flow is responsible for loss of lift on very tapered wings—in fact, I think he is exaggerating the cross-wind pressure gradient idea altogether; the loss of maximum lift of very tapered wings is almost certainly due to premature stalling towards the tips.

I find it difficult to follow Mr. Needham's reasoning in his last two paragraphs; he seems to think that there is an actual sparewise direction of inflow over a wing tip, whereas, in fact, it is a mere bending inward of the ordinary flow and nothing like as depicted in his diagram: in any case, the meeting of two convergent flows would give what Mr. Ower would call a "convergent region"—with less tendency to stall; I have observed such a flow near the down-wind tip of a yawed Leopard Moth. Mr. Needham finally seems to assume that there is no tip vortex at the down-wind tip in a side-slip—I do not follow him. W. E. GRAY.

Edgware.

F/O. Stodart comes in to land with the Luton Buzzard. The split flaps can be seen in their fully down position. (*Flight* photograph.)

A BUZZARD in its ELEMENT

Flying the Latest Ultra-Lightweight : Sailplane Characteristics of the Luton Buzzard : The Pleasant Pusher

By H. A. TAYLOR

FEW people who have had any experience of the pusher type of aeroplane will deny its charm, and this type has always appeared to me to be particularly suitable for the use of the private pilot who flies for pleasure alone. He or she, of course, is the pilot to whom the lately revived ultra-light machine is most likely to appeal, for few of these machines are designed to have the performance demanded for serious long-distance travelling.

In the new Luton Buzzard (described in *Flight* of June 18) Capt. Latimer-Needham has endeavoured to provide a machine with the pleasant features of the pusher yet possessing a performance which would enable it to be used for serious cross-country work in reasonable weather. With his experience in the design and construction of sailplanes, it might be expected that his latest creation would embody those features of the sailplane which make for air-borne efficiency, and the Buzzard is clean enough, for instance, to necessitate the use of split flaps in order to steepen the glide and reduce the period of natural float while holding-off. It is worth noting, however, that, with a landing speed below 30 m.p.h., a mild tendency to float is of small importance even when fields are being used, and flaps in this case can still be looked upon as pleasant luxuries which enable the pilot to stretch or shorten the glide at will.

The wooden structure of the Buzzard is simple, the engine is accessible and—of greater importance to the prospective owner—the outer sections of the semi-cantilever wing may be quickly removed, leaving an actual storage width of 7½ ft.

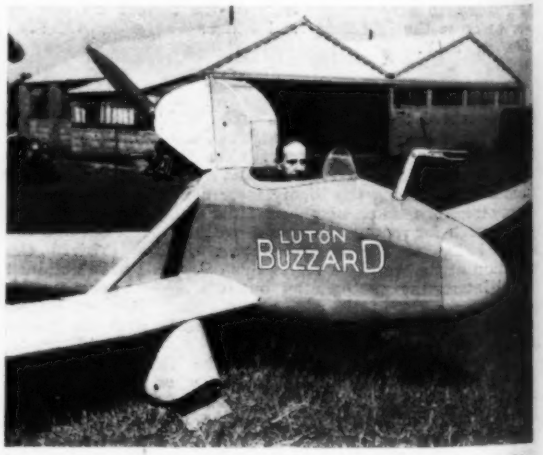
For preliminary flying experience with such a machine the conditions at the little Barton aerodrome were far from ideal. Though an almost entire lack of wind allowed one to use the longest run, the grass was so long that this lack of wind proved to be a distinct handicap. Naturally enough, the grass both spoilt the acceleration and reduced the available lift at the critical speed. Before entering the machine I had, in fact,

LUTON BUZZARD

Specification with Anzani Engine.

Weight (including equipment)	600 lb.
Disposable load	200 lb.
Length overall	20 ft.
Span	40 ft.
Span (wings detached)	7½ ft.
Height	5½ ft.
Maximum speed	85 m.p.h.
Cruising speed	75 m.p.h.
Endurance	4 hours.
Stalling speed	25 m.p.h.
Initial climb	450 ft./min.
Price	£325

Makers: Luton Aircraft, Ltd., Barton-in-the-Clay, Beds.



The designer, Capt. C. H. Latimer-Needham, in the cockpit of the Buzzard. The machine can be flown comfortably without helmet or goggles. (*Flight* photograph.)

practically made up my mind to content myself with a few full-throttle runs and then to await a more suitable day. Although F/O. Stodart had already taken the machine round and cleared the tall hedge—even with the flaps accidentally left in the down position—I did not feel that one with no previous experience of the best acceleration attitude would clear this hedge with quite the margin necessary for safety. However, after two preliminary runs—the second of which provided a short flight of 1907 dimensions—the machine was eased off the ground with eighty yards or so to spare.

In the Air

Immediately the machine was air-borne I realised just how much better the take-off could be with a reasonably smooth and well-mown runway. Flown off tarmac, even in a flat calm, I doubt if the run would be much more than a hundred yards, and the climb is quite good enough to enable one to clear any fairly placed obstacles. It appeared that an airspeed of 50 m.p.h. provided the most effective rate of climb, though this would vary, of course, according to the state of the air and the heat of the day.

With no previous experience of sailplanes I expected to have some little trouble with accurate fore-and-aft control in a machine fitted with an all-movable tailplane. In fact, after one preliminary "straight," I had no difficulty in keeping the attitude steady either on the ground or in the air; all that was required was a constant and gentle forward pressure on the stick. Nevertheless, later machines will be modified for the benefit of any ham-fisted purchasers. During the actual take-off I made the mistake of attempting to hoist it into the air on the strength of an apparently adequate indicated air-speed and succeeded only in losing a little hard-won speed; five more seconds of tail-up acceleration would have done the trick, and only the fear that the machine was never going to unstick in the long grass caused me to disregard instinct and pin my faith on an A.S.I.—which might have been showing anything from 25 to 40 m.p.h. with its swinging needle. With a little more space no newcomer will have any qualms about the take-off. The rudder control is adequate throughout and not so sensitive as to cause over-correction when "aiming" along a short nose. In the air the controls are, I imagine, typical of the sailplane, with light and effective directional and fore-and-aft controls, but with somewhat stodgy ailerons—stodgy, that is, to the pilot who is more accustomed to small-span machines providing a 100-m.p.h. draught over these surfaces. However, one hardly uses them, since the Buzzard will turn accurately almost on rudder alone and is particularly stable laterally.

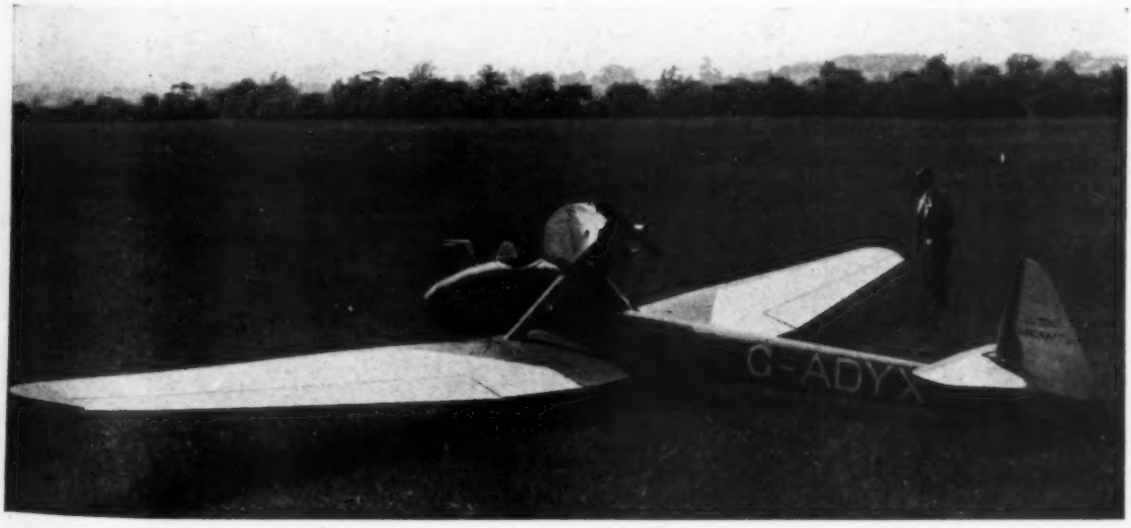
That the airscrew fitted to the prototype machine is of too fine a pitch was suggested by the fact that, even on the ground, the Anzani twin would reach 3,500 r.p.m.—500 r.p.m. more than the speed for which the airscrew was designed. The maximum speed, consequently, was below normal, and I obtained about 75 m.p.h. on full throttle without loss of height; at 3,000 r.p.m. the speed was as high as 65 m.p.h., even though the machine was flying on less than half-throttle. This engine, too, was fitted with a manually operated ignition control, but later examples will probably have automatic ignition, a throttle control of sensible proportions, and at least one magneto of the impulse starter type. With a rigid engine mounting it is not, perhaps, unusual that vibration should be noticeable on the ground at certain speeds, but almost non-existent while in the air. A distinct advantage of the pusher type is that the exhaust crackle from the stub pipes should not be particularly obvious while in the air—though neither helmet nor goggles was necessary or worn. Grass seeds from the interior of the cockpit proved to be the source of the only minor discomfort experienced! It is really very pleasant to fly with the engine and the slipstream behind and with an almost complete hemisphere of forward view. Only in this way can one see the world.

Unexpectedly enough, with a comparatively high thrust line, the Buzzard glides, engine off, at about 50 m.p.h. with no obvious elevator load in either direction; one might have expected it to demand forward pressure, since this is necessary to a small degree in powered flight. I brought it in at a speed a little below 50 m.p.h., though 40 m.p.h. is ample, even with the flaps down. These, incidentally, are operated directly by means of a horizontally placed lever on the left, and some six or seven different positions can be used.

The First Approach

After a short period of gliding with the flaps up in order to obtain some idea of the way in which a glide can, when necessary, be stretched, I put them down with enough height to spare (in my own estimation) to permit a little crab side-slipping. In fact, none was really necessary, though a mild slip was held sufficiently long to discover that such approach adjustment could be made without difficulty, and I should say that the glide, with flaps down, is of the order of 8 to 1—sufficiently steep to please anyone. The pilot can always raise the flaps in a second if undershooting is suspected, and different speeds will always give different approach angles.

Forgetting that the Buzzard's ground angle is very slight, my landing was of a mildly tail-first variety. No difficulty was experienced in checking the glide without pump-handling, and at the moment of stall the stick was eased right back; unfortunately the elevator was still powerful enough to increase the incidence, and the tail skid perched half a second before the undercarriage. I should imagine that the machine is better landed on sailplane lines—that is, flown gently on to the ground. Once the wheels have touched at less than 30 m.p.h. all way should have been damped out and the landing run, in any case, is a matter of a few yards. This type of landing, within reasonable speed limits, should be much simpler for the novice than the much-vaunted three-pointer which is necessary with the more normal type of machine. Furthermore, as the tail cannot then be depressed beyond a very small limit, no ballooning will result from a gentle wheeler. H. A. T.



The clean and handsome lines of the Buzzard are obvious in this view, which also shows that the fuselage is almost parallel from engine to tail. (*Flight* photograph.)

THE INDUSTRY

Stainless-steel Fittings

VERY many products in stainless steel are dealt with in a catalogue recently issued by Bruntons (Musselburgh), Ltd., of Musselburgh, Scotland. They include wire and rod in a wide variety of section, streamline wires and tie-rods, lock nuts and pins, fork joints, cable fittings, steel rope, strip, etc.

The Moving Finger Writes . . .

AIRCRAFT and engine manufacturers should find a considerable number of uses for an electric metal-engraving tool recently produced by Runbaken Electrical Products, of 280, Deansgate, Manchester, 3. The actual marking is done by the high-frequency beat of a hardened-steel point cutting into the metal some thirty to forty times per second. The mains-driven A.C. model is priced at £5 19s. 6d. Another model, an arc etcher for hardened steel, costs £2 9s. 6d.

Hollow Rivets

SINCE the introduction of all-metal aircraft construction, extensive use has been made of riveting in joining small parts together. Several riveting processes are in use, but for somewhat inaccessible places one of the most popular is that known as "pop riveting," which makes use of hollow or tubular rivets which can be headed without holding up. Thus the construction of hollow members becomes a relatively easy process. A very interesting booklet on Hollow Rivets as applied to aircraft construction has just been issued by Geo. Tucker Eyelet Co., Ltd., of Cuckoo Road, Birmingham, 7. This booklet has for its object to set out the advantages of using hollow rivets in aircraft construction, and deals with the so-called "cup rivets," "capped cup rivets," and "pop rivets," as well as with the special tools which are available for setting and clenching hollow rivets. Free copies of the booklet are available to responsible readers of *Flight* who are engaged on aircraft construction. Applications should be sent to the makers and not to *Flight*.

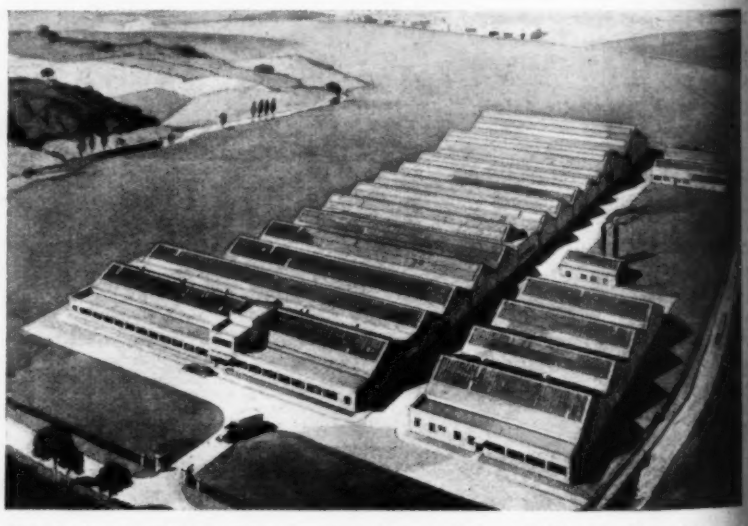
Structural Steelwork

THE accompanying drawing—of the new factory of Boulton Paul Aircraft, Ltd., at Wolverhampton Airport—is one of many illustrations from the impressive new catalogue entitled "Airports and Aircraft Factories," issued by Boulton and Paul, Ltd., the well-known structural engineers, who had an origin common with that of the firm of Boulton Paul Aircraft, but which is now an entirely separate concern.

The catalogue shows particularly well the adaptability of Boulton and Paul's steelwork; for example, it shows the full-scale wind tunnel at Farnborough, undoubtedly one of the most advanced examples of structural steelwork in the world. Then there is the huge Saunders-Roe erecting shop at Southampton and the Hawker hangar alongside the Byfleet banking at Brooklands. Both these latter are examples of buildings to suit special ground conditions; the former is a waterside hangar of 50,400 sq. ft., and the other, which measures 550 ft. by 80 ft., had to be accommodated in a long, narrow space close to the inside of the Brooklands race track. In the first, 13¼ miles of steelwork was used, and in the second 12½ miles.

Again, speed of erection is proved by details regarding the big Airwork hangar at Heston, which has an unobstructed single span of 200 ft. From start to finish the building took only fourteen weeks.

Some of the other buildings illustrated include Phillips and Powis' erecting shop and service hangar at Reading, Shoreham Airport hangar, Jersey Airways' hangar at Heston, the A.S.T. school building at Hamble, and hangars erected at various airports in the Colonies. Those interested may obtain copies of the catalogue from Boulton and Paul, Ltd., 139, Queen Victoria Street, London, E.C.4.



This is the new factory of Boulton Paul Aircraft, Ltd., at Wolverhampton Airport. All correspondence should now be addressed to the company at the new factory (Telephone : Fordhouses 91). The building, which embodies 350 tons of steelwork, was erected by Boulton and Paul, Ltd., of London and Norwich, and this drawing is from their finely illustrated new catalogue referred to in the adjacent column.

PUBLICATIONS RECEIVED

Aeronautical Research Committee Reports and Memoranda. No. 1675: Graphical Method of Calculating Performance of Airscrew, by C. N. H. Lock, price 2s. No. 1677: Flight Tests on an Atlas fitted with Autoslots having various Link Arrangements, by W. G. Jennings, 9d. No. 1695: Effect of Static Pressure along the Axis of an Open Jet Tunnel of (*a*) Nozzle Flare and (*b*) A Ring in the Collector, by F. B. Bradfield and G. F. Midwood, 6d. H.M. Stationery Office, Adastral House, Kingsway, London, W.C.2.

Guide for Flying Instructors. Price 5s. 6d., Guild of Air Pilots and Air Navigators of the British Empire, 61, Cheapside, London, E.C.2.

Der Werdegang und Wandel der Luftschiffverwendung im Seekrieg, Dr. Helmut Beelitz. Price 3.80 marks. G. H. Nolte, Dusseldorf,

Small Two-stroke Aero Engines, by C. F. Caunter. (Aeronautical Engineering Series.) Price 6s., Sir Isaac Pitman & Sons, Ltd., Parker Street, Kingsway, London, W.C.2.

Practical Aircraft Stress Analysis, by D. R. Adams. Price 8s. 6d., Sir Isaac Pitman and Sons, Ltd., Parker Street, Kingsway, London, W.C.2.

From Heston to the High Alps, by Douglas Fawcett, Price 6s., Macmillan and Co., St. Martin's Street, London, W.C.2.

Aircraft of the British Empire, by Leonard Bridgman. 2nd Edition. Price 5s., Sampson Low, Marston and Co., Ltd., 100, Southwark Street, London, S.E.1.

Der Nachtluftverkehr. Grundlagen und Wirkungsbereich, by Prof. Dr.-Ing Carl Pirath. Verkehrswissenschaftliche Lehrmittelgesellschaft M.B.H., Bei Der Deutschen Reichsbahn, Berlin, Germany.

Booklet: Bristol Municipal Airport.

National Advisory Committee for Aeronautics. Report No. 552: Wind-Tunnels Tests of 10-foot-Diameter Autogiro Rotors, by J. B. Wheatley and C. Bioletti, Price 10 cents. No. 553: Some Effects of Argon and Helium upon Explosions of Carbon Monoxide and Oxygen, by E. F. Fiock and C. H. Roeder, 10 cents. No. 554: Wind-Tunnel Investigation of Ordinary and Split Flaps on Airfoils of Different Profile, by C. J. Wenzinger, 10 cents. No. 555: Air Flow Around Finned Cylinders, by M. J. Brevoort and V. G. Rollin, 10 cents. No. 556: Further Studies of Flame Movement and Pressure Development in an Engine Cylinder, by C. F. Marvin, Jr., A. Wharton and C. H. Roeder, 10 cents. Superintendent of Documents, Washington, D.C., U.S.A.

NEW COMPANIES

In the notes below, for reasons of space, the "objects" of new companies are usually somewhat abbreviated.

CORNERCROFT, LTD. (Mechanical, agricultural, aircraft and general engineers, etc., Ace Works, Queen Victoria Road, Coventry).—The nominal capital has been increased by the addition of £149,900 beyond the registered capital of £100. The additional capital is divided into 120,000 6 per cent. cumulative preference shares of 10s. and 449,500 ordinary shares of 4s. The company has now been converted into a public one.

THE NORTHEY-BOYCE ROTARY ENGINEERING COMPANY, LTD., was registered as a private company on July 30 with a nominal capital of £80,000 in 60,000 participating preference shares of £1 and 80,000 ordinary shares of 5s. The objects are to acquire from Northey Rotary Engines, Ltd., a certain licence set forth in a draft deed and agreement with Harold L. Boyce, M.P., to manufacture, produce and deal in all kinds of plant and machinery, and to carry on the business of mechanical engineers, etc. The first directors are: Harold L. Boyce, M.P., Thomas L. Squires, John H. Beach, and others to be appointed by the subscribers. The registered office is at Thames House, Millbank, S.W.1.

AIRCRAFT GENERAL SUPPLIES, LTD. Private company, registered July 30. Capital £10,000 in £1 shares. Objects: to carry on the business of factors and agents for and dealers in accessories, spare parts, components and stores for aircraft and internal combustion engines, etc. The subscribers are: Geo. M. Duncan, 90, St. James Road, Wandsworth Common, London, S.W.17: Felix J. Chivers, 100, Queen Elizabeth's Drive, Southgate, London, N.14. The first directors are not named. Secretary: Geo. M. Duncan.

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